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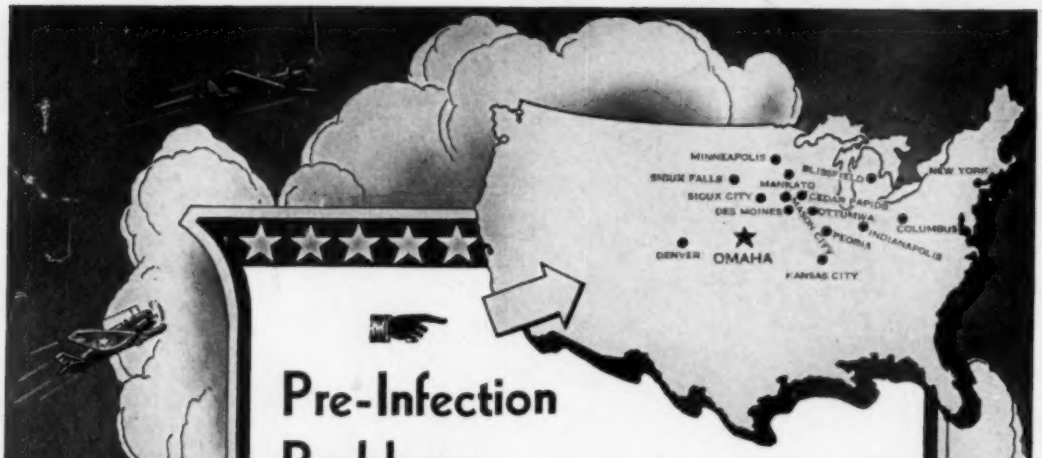


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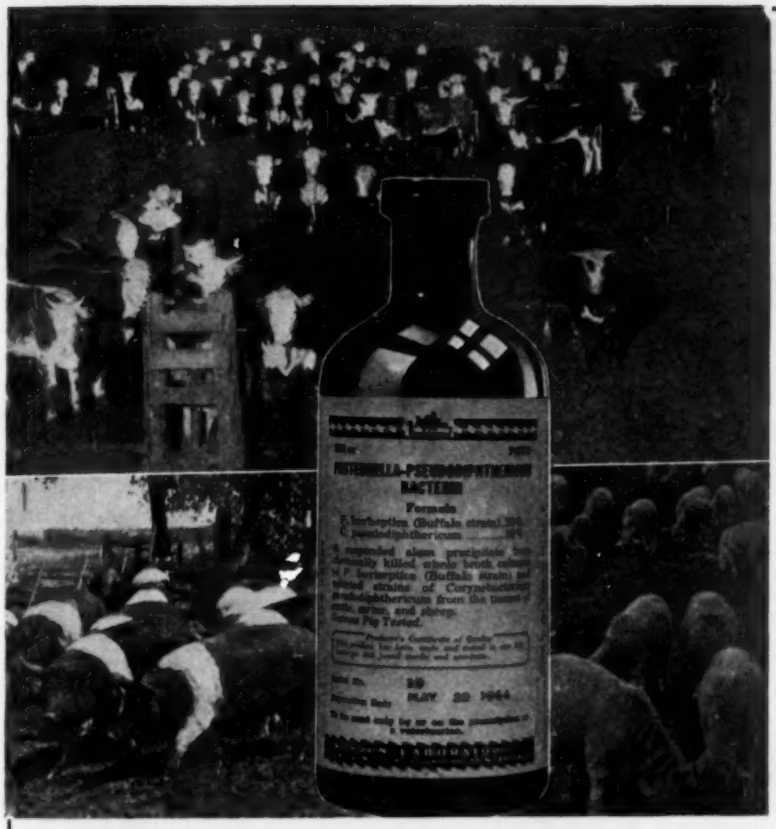

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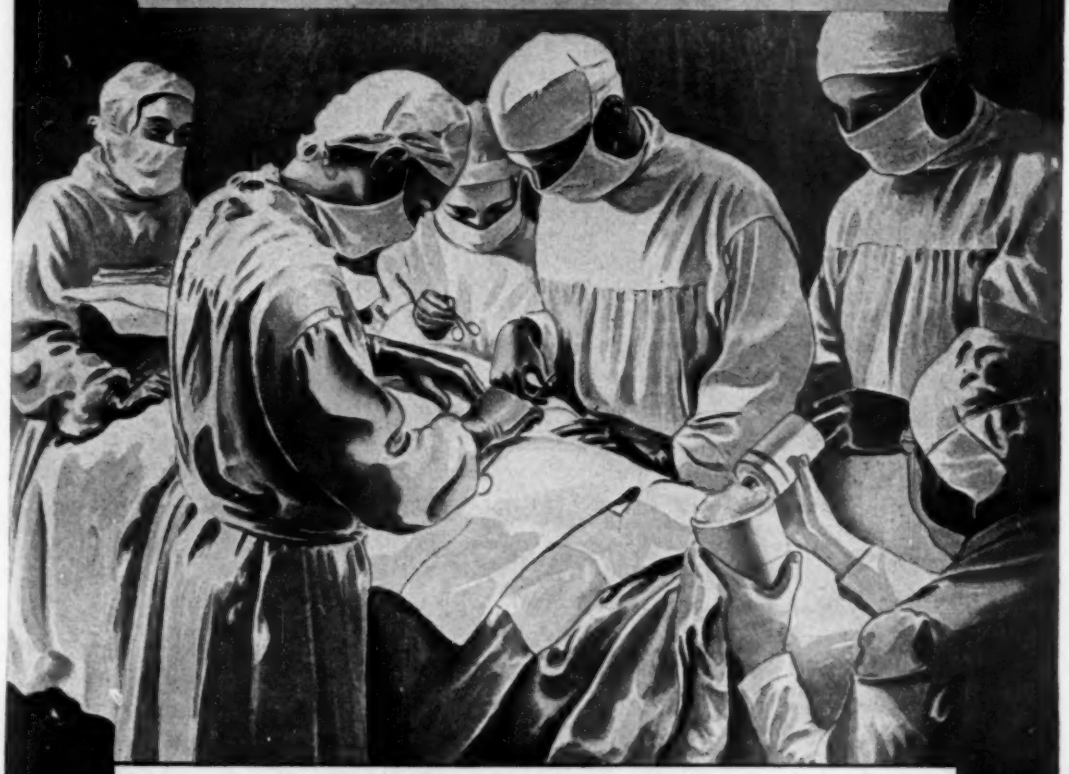
WHAT THE
# VETERINARY PROFESSION
MEANS TO MANKIND



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# Modern War and Farm-Animal Diseases

MARK WELSH, D.V.M., M.S.
*College Park, Md.*

MODERN WAR is like all previous wars in its objectives and results. The techniques are modified, the speed increased, and the weapons improved, but the battles are over the same ground and on the same seas. Wars in the past have been waged to protect or spread a religious belief; to protect or impose a given type of government, and for more sordid reasons of acquiring lands and cheap labor for commercial development.

Whatever the reason given, however, the countries of both the victors and the vanquished are invaded by the four horsemen of the Apocalypse—*hate, greed, famine* and *pestilence.* They have ridden with devastating results in the war-torn countries and even now are making forays in this country as we are experiencing unexpected shortages that vitally affect our lives.

## NATURE'S WAYS AGE-OLD

As a people, we have demonstrated surprising speed, skill, and ingenuity in making planes, ships, and munitions. Marvelous machine tools have been built that produce uniformly exact parts under hands having little skill or training. These, however, are no more marvelous than our machine tools of agriculture—our mature cows, sheep, hogs, horses, and poultry. Cargo ships are now built in a matter of days instead of months under the stimulus of war and our great need of them. Unfortunately, these producers of meat, milk, eggs, and power that feed our people cannot be greatly speeded up in their functions. Nature still follows her age-old methods and requires nine months to make a calf and three months, three weeks, and three days to mature a litter of pigs. We are making every effort to supply our own increasing need of food and that of our allies. But, as we increase the animal units on our farms for the benefits of better management and economy of handling, we, in most instances, increase and concentrate their diseases and pests that tend to minimize the benefits sought.

The United States is called upon to serve as the food arsenal for democracy. Production goals have been set for several agricultural products, and our greatest needs are for the vitamin carrying, protective foods—meat, milk and eggs. Our nutritionists have long warned us that our own people have too few of these in their diet. Satisfying our own needs under a heavier national working schedule and those vital needs of our allies places a tremendous responsibility on all connected with agriculture. As animals are concentrated in larger numbers on our farms and fed for maximum production, we must expect greater disease losses. There is re-

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ported, from federal sources for 1941, a loss of some 300 million dollars from 16 odd animal diseases and poultry diseases. This is not claimed to be exact, but is probably as reasonable a guess as any could be without supporting facts. Neither does this large loss include many minor diseases and conditions which would swell the total still more. It is, however, largely the responsibility of the veterinary profession to curtail this loss which we now can ill afford.

### VITAL DEFICIENCIES IN THE VETERINARY SERVICE

A fair appraisal of the facilities of the veterinary profession for the job we have to do in conserving our food supplies and protecting the public health indicates that we are definitely deficient in critically needed services, if not materials. These shortages, like others we are experiencing, are chargeable wholly to no individual or group, but rather to all of us for failing to evaluate the present and anticipate the future needs properly. Time is short. Corrective measures can and should be taken before more serious consequences overtake us and jeopardize our animal and poultry industries.

To control any disease condition, we must first have an accurate and rapid diagnosis; we must know the numbers of individuals that are sick or exposed and their locations; through quarantine or other measures, we must exercise every reasonable means of preventing spread; and while the infected are being treated, the susceptible must be protected by vaccination or by sanitary measures. When infectious disease occurs on a man's premises, it cannot be considered only as a private misfortune. It is a community menace and imposes a public responsibility.

To meet this situation many feel that we need and must have:

1) Diagnostic laboratories provided by governmental agencies to which the veterinary practitioner may send blood, milk, tissues, and other specimens for an accurate and rapid diagnosis.

2) Mortality and morbidity statistics compiled in each state on the kind and extent of animal disease, and that the compiled data be sent to the practitioner at regular intervals so that he may be aware of the conditions in adjacent areas and take such measures as may protect his clients' stock.

3) Adequate laws and regulations through which minimum standards are set for the efficiency of pharmaceuticals and biologics used in the treatment of domestic stock, and that proven dangerous products be confined to those qualified to use them.

### DIAGNOSTIC LABORATORIES ESSENTIAL

A competent veterinarian can, in many instances, successfully diagnose the ailments of domestic stock by the symptoms, history, and other factors, and by drawing on his training and experience. In many other instances, however, it is most difficult if not impossible to make an accurate diagnosis and initiate intelligent treatment without the aid of modern laboratory facilities used by a trained pathologist. The determination of animal disease requires the same laboratory equipment and equal skill as does the diagnosis of human infections. Today, the medical and the veterinary students have fairly equivalent educational advantages for their respective fields. Our veterinarians are well trained in the ways of disease, but they are not endowed with better sight or keener perceptions than physicians. The problems of the physician in diagnosis of disease are our problems also. Yet, for many years, free laboratory facilities have been provided jointly by state and federal governments for the practicing physician, and they have paid high dividends in determining new centers of infection, in preventing spread of disease, and in saving lives that certainly otherwise would have been needlessly sacrificed.

It seems obvious that we have needed and need now adequately equipped diagnostic laboratories as an integral part of the veterinary regulatory organization of a state if disease centers are to be known, and spread from such centers prevented. Less than half of our states have anything approaching adequate facilities for making laboratory diagnoses. Commercial laboratories, in many instances, generously have filled a need the governmental agencies

failed to provide, but, unfortunately, they have tended to delay the day when laboratories are recognized as a necessary part of a regulatory organization.

Intelligent stockmen and poultrymen are well aware that an increasing number of diseases and conditions can be rapidly and accurately determined by laboratory procedures only. All agricultural and livestock taxes are high. The most burdensome, however, are those levied by virus, parasitic, and bacterial diseases from which everyone loses—including the consumer who indirectly pays tribute through increased food prices. Public funds used to provide veterinary diagnostic laboratories as a part of the regulatory and disease control organization would pay high dividends in lowering and preventing such losses. The financial and public health benefits would accrue to the credit of the stockmen and the public. But, through such laboratory service, the practicing veterinarian could more adequately render the services of which he is capable, and the regulatory official could more nearly accomplish the duties with which he is charged. In the present emergency, we must have them to prevent gross and unnecessary waste of our animal food supplies, to insure healthful milk and meat supplies to our people, and to safeguard the public from the many animal diseases to which man is susceptible.

## STATISTICAL RECORDS LACKING

If the first problem of disease control is diagnosis, then the second is knowing its geographic distribution and the numbers of individuals sick or exposed. It is certainly the duty and responsibility of the regulatory officials to determine this if spread from infected centers is to be prevented. The information as to the initial centers of infection must come from practitioners reporting it, from regulatory officials encountering it, from laboratory reports, or from interested private individuals. Although in virtually all states the regulatory official has legal authority to quarantine or employ vaccinational or other means of safeguarding the public from loss, the lack of the services discussed here often nullify his best efforts.

No mortality and morbidity statistics are regularly compiled and distributed in this country with the exception of a few, such as tuberculosis and Bang's disease. No accurate and readily available data are regularly published on hog cholera, rabies, encephalomyelitis, anthrax, or several other costly diseases. Trichomoniasis, equine infectious abortion, Johne's disease, and other such conditions are reported in the scientific literature, but rarely, if ever, in a statistical column. No private practitioner can give his clients proper advice and protection if he is unaware that dangerous communicable disease is prevalent in the next county. No livestock sanitary official can function efficiently when he is uninformed of conditions within his own territory, in adjacent states, or in distant states from which livestock are imported.

*Are Practitioners Delinquent?*—No one would seriously question the definite need for mortality and morbidity statistics on our animal populations. Such meager data as we have are repeatedly quoted with telling effect, to show the accomplishments of our work. To be of maximum value, three groups must coöperate for their mutual advantage — private practitioners, regulatory officials and federal agencies. Some contend that the private practitioner will not take the time to report regularly. This blanket condemnation remains to be proved. When serious outbreaks of foot-and-mouth disease or other maladies have threatened our livestock, all veterinarians have coöperated in its control or eradica-

tion. Food and especially meat shortages now face us, and we are little short of saboteurs ourselves if through negligence we permit our ancient microbial enemies to destroy any part of our animal resources. The Federal Bureau of Investigation and police departments use two-way radio communication to fight crime and protect the public. It seems reasonable that our job of fighting microscopic murderers should merit two-way postal service at least. In any case, disease data must be collected, compiled, and distributed if we are to know of our centers of infection in time to prevent major losses.

*Livestock Remedies Commercially Exploited.*—Domestic stock cannot be profitably and successfully raised unless their diseases are prevented or controlled. Trichomoniasis, Bang's disease, and mastitis have frequently prevented the genetic improvement of a herd and forced the owner to seek help after the damage was done. Today, when a veterinarian of mature years, with highly technical training and years of experience, so frequently encounters baffling cases, it seems incredible that dangerous biologic products and drastic drugs are freely sold to those having little, if any, knowledge of their use. Reputable manufacturers pride themselves on the purity and efficiency of their products and are rendering a real and valuable service. Others, unfortunately, under present laws and regulations, are permitted to exploit the livestock and poultry industries with products of questionable merit if not dangerous in themselves.

In 1884, the United States Bureau of Animal Industry was established by demand of farmers and stockmen for the control and eradication of several widespread animal diseases. Foreign markets were closed to us and no domestic outlets were available. The records show how well the Bureau and the veterinary profession accomplished the tasks imposed. A woman does not become a food expert or dietitian through cooking the family meals. A man is not competent to diagnose his physical ailment because he has used his body for 50 years. Why, then, can it be assumed that a stockman, because he works with animals, is capable of diagnosing and effectively treating their diseases? How much less capable of rendering aid is the drug clerk, who advises the stockman on his purchases of drugs, serums, and vaccines without even seeing them? It seems to be a question of the blind leading the blind into a war of diseases where even those with the keenest sight and knowledge tread with caution.

*False Claims Made.*—The advertisements of many products for the treatment of animal ailments demonstrate the insidiousness of half truths. Outright false statements have given way to implied claims. Many prominently feature the fact that they hold a federal license and indicate that their product is made under the watchful eyes of federal inspectors and is, in effect, sponsored by the federal government. Unfortunately, this is not true and the purchaser's confidence is often rudely violated.

In general, we appear to have two standards for pharmaceuticals and biologic agents. One is maintained at a high level, through the purity and efficiency of their products, by organizations who value their good name. The other is maintained at a level on the fringe of the law, and, as they have no good name to be proud of, these organizations shout loudly in type of their federal license number and what it implies. Certainly, in fairness to the purchaser, minimum standards for all should be established and maintained. We at present invite fraud—and many have answered the invitation.

*Regulatory Officials Thwarted.* — The chief livestock sanitary official in each state is charged with the responsibility of the control and eradication of the diseases of livestock and poultry. Appropriate rules and regulations govern these activities within a state. Both state and federal laws or regulations prohibit the interstate movement of diseased animals or those that have recently been exposed, and the need for these is obvious. Manufacturers of biologic products must secure a federal per-

mit to conduct an interstate business. There are some eight live viruses and vaccines at present shipped interstate which are capable of setting up new centers of infection and endangering livestock or poultry in the communities where they are used. There is no fundamental difference between the shipment of a diseased animal into a community and the shipment of the living causative agent of the disease in a bottle.

With few exceptions, the federal government does not regularly test these products for potency or purity, or otherwise have close supervision over their manufacture. However, as long as these products remain in the original package, they may be sent into any state. Frequently, this is in violation of the laws of the state of destination and in violation of accepted disease control practices. Under present regulations, neither the state nor federal officials of a state are informed as to where these disease producing agents are shipped. If the right is assumed to license and permit the shipment of a dangerous product into a state in violation of its laws, it seems reasonable that the responsibility be accepted for its proper use at the point of destination. It is even less understandable why regulatory officials charged with the responsibility of controlling and eradicating animal disease should be denied knowledge as to where a new center of disease is established, whether it be imported in a sick animal or through infection imported in a bottle.

*Fraudulent Vaccination.* — Many states and the federal government are paying indemnity on animals that react to the agglutination test for Bang's disease. The unrestricted sale and use of Bang vaccines jeopardizes the program for the control and eradication of this costly disease. It may also be fraudulently employed to collect indemnities, as diagnostic tests do not differentiate between an animal that reacts as a result of vaccination and one having active infection. Even in cases of suspected fraud, officials are powerless to act, as the manufacturer can refuse to report the sale of the vaccine. It seems unfair and unjust that state and federal officials should be forced into a position where funds entrusted to them may be improperly and fraudulently used.

The unrestricted sale and distribution of live viruses and vaccines often results in the unconscious sabotage of our livestock by our own people. If we grant the contention that an owner has the right to treat and immunize his own stock, we still must deny him the privilege of establishing new centers of infection and thus jeopardizing his neighbor's stock. The rights of the individual are subservient when the good of the whole is endangered. The regulatory officials of the various states have repeatedly asked that they be informed when shipments of live viruses and vaccines capable of starting infection are shipped into their states. They are willing to assume responsibility for the proper use of these products in accordance with their state laws and regulations. They are seriously handicapped, however, in the discharge of their duties when their state laws and regulations are flagrantly violated with impunity and with no recourse.

### PROUD OF BATTLES WON

The administrators of the law are not at fault, nor, perhaps, are those who take advantage of it to market products of little if any value. It is quite possible that we who know of its weaknesses and failures are at fault for not making strenuous efforts to have it modified and strengthened to give the stockmen and poultrymen the protection they deserve.

Behind the war of guns, planes, and ships manned by brave men are other battles whose outcome may help shape our future. As veterinarians, we are engaged in that most ancient of wars of man against microörganisms. All of us have colleagues who were killed or maimed by tuberculosis, undulant fever, and the other insidious, deadly germs of our every day experience. We are justly proud of the battles we have won with vaccines, serums, drugs, sanitation, and the scalpel. Bovine tuberculosis is but an unpleasant memory to most cattle owners, and its menace for our milk-drink-

ing children is largely past. Yet, records show that unsuspected centers of infection are still too frequently found and the tuberculosis battle is yet to be won. The fight against Bang's disease is still in the balance and that against mastitis hardly begun. No one would seriously contend that the diseases of poultry are under control, nor that our present practices are likely to lead us to that happy day.

*New Diseases to Conquer.*—In addition to the older diseases against which we have won but few decisive battles, there are several new diseases and conditions which have developed. New virus, bacterial, protozoal, parasitic, nutritional, and physiologic diseases are being encountered with increasing frequency. These are in part due to our demand for maximum production from individuals and to greater concentration of animal units on our premises. We must not forget that disease travels at the same rate we do and with our aeroplanes and people speeding to all parts of the world, it will be a minor miracle if foreign plagues are not introduced.

Modern war increases the problems and difficulties of our ancient microbial war. We must readjust our strategy and establish better lines of communication with each other to know where the enemy is massing his forces to strike next. That is why diagnostic laboratories, vital statistics and adequate control of live viruses and vaccines are of primary importance now—today. Disease, the insidious barnyard killer and saboteur, murders, maims, and stunts its victims. It costs stockmen and poultrymen many times as much as would the facilities and services needed to minimize or eliminate it.

"Food will win the war and write the peace"—if alert, intelligent veterinary service functions as it can and should.

---

There are 1,500,000 tractors on 1,400,000 farms in the United States. Since there are a total of over 6,000,000 farms and there are many horses on farms having tractors, the days of horseless farming are a long, long way off.

## Business and Public Health

Assuredly, the thing called business was never particularly interested in public health. On the contrary, it has in many instances kept public health officials from doing a thorough job.

Polluted streams kill the fish and spread ill health to the towns below. To clean them up would interfere with business. Factories contaminate the air with smoke and gas and toxic droplets that smudge the lungs and poison the pastures, because in business "the show must go on." Light and air and deadly devices were improved against steady opposition. When replacements were plenty and wages low none of these showed up on the balance sheet. Latrines of the Chic Sales type in sizable towns and on farms continue to exist. The whole southern end of Lake Michigan is contaminated by vast industries strewn along its shores, threatening the health of 4,000,000, despite the millions spent on prevention. This is but one of many examples. All this is understandable to the veterinary profession although it deals only with diseases of the animals which provide the people's food.

But, let's be charitable. Ours is by no means a finished nation. Its development was rapid—too rapid to cure everything as fast as business expanded to meet the country's needs. Just now all hats are off to business—the country's hope and salvation.

---

The incomputable suffering of this hour in many parts of the world will condemn the Japs and Nazis for centuries to come.

---

Before World War I, through science and thrift, Germany had the world at its feet, but she sacrificed all at the altar of Mars.

---

At war with Japan, Americans should remember that we are in conflict with a nation that fights German style with a feudal hang-over.—*Science News Letter.*

# Embryonal Nephroma in a Calf

ROLAND WALKER, Ph.D.
*Troy, N. Y.*

THE FINDING of a mixed kidney tumor in a calf seems to warrant a brief report, both because of the rarity of this type in cattle, and because of the unusual extranephric location of the tumor. Although most neoplasms may be classified according to their epithelial or mesenchymatous origin, there are some well-defined classes of mixed tumors. Among the best known of these is the "Wilms' tumor" of the kidney, renal adenosarcoma, or embryonal nephroma, perhaps most often found in man and in swine, but also recorded for various other species. These tumors, unlike the commoner neoplasms, are generally found in young individuals, and the greatest variety of tissue types may be included: not only generalized spindle-cell, sarcomatous, adenomatous, and carcinomatous elements, but even smooth muscle, fat, cartilage, bone, and striated muscle. The customary renal location, the obviously renal type of many adenomatous elements, the frequent finding of areas closely resembling fetal metanephros, together with the average youth of the animals affected, have led to a variety of hypotheses incorporating the idea of origin from embryonic cells of the metanephros or its primordium. From this point of view, the tumor might correctly be considered an organoid teratoma. However, though these embryonal nephromas are usually well encapsulated, and do not metastatize too freely, both sarcomatous and carcinomatous metastases have been recorded. Even more frequently, the histological relation of the tumor parts to each other and to their blood vessels gives the appearance of malignancy.

From the Biological Laboratories of Rensselaer Polytechnic Institute. Special thanks are due to Dr. William H. Feldman of the Mayo Foundation for suggestions, and for reading the manuscript; to Dr. Gustavus H. Klinck, Jr., Pathologist of the Samaritan Hospital, Troy, for the use of photomicrographic equipment; and to Mr. Harold Fivel of Troy, who contributed the specimen.

## Report of a Case

The tumor under consideration was from a calf (*Bos taurus* L.) about 3 weeks old (sex not reported), and was brought to the laboratory about a day after slaughter. It was said to have been imbedded in fatty tissue just ventral to the right kidney. The capsule showed no break by which there might have been continuity with the kidney, so the tumor may be considered as completely extranephric. No search was made for metastatic nodules, but no other peculiarities were noticed at the time of slaughtering.

The tumor weighed 486 Gm. and was a slightly irregular spheroid, averaging 10 cm. in diameter. It was well encapsulated, with a somewhat lobulated surface, and the consistency of the whole was moderately firm and elastic. On section across the middle, the capsule was seen to be 1 to 3 mm. thick, and connective tissue septums divided the substance of the tumor into many lobules. Most of these were moderately firm and grayish-white to pinkish, and of such sizes as 1 x 1.5 cm., 2 x 4 cm., etc. One of these was slightly brownish, and one small one (2 mm. diam.) showed bright yellow pigment. One small area contained a clear serous fluid. This and other smaller areas between the main lobules were composed of many small thin-walled vesicles, 0.5 to 5 mm. in diameter. Vascularization was moderate to light. Pieces of the tumor were fixed in Bouin's fluid and in formalin.

Histologically, there was a wide variety of structure. The main lobules were sometimes almost completely sarcomatous, sometimes mostly adenomatous, but more often they were mixed.

The thin-walled vesicles were often associated with adenomatous areas (fig. 1), but they themselves were usually lined by transitional epithelium (fig. 1 and 2). One

lobule had the appearance of fetal metanephric tissue, with numerous well-formed tubules in a compact stroma. In a few places, there were infoldings of the wall (usually without capillaries) resembling rudimentary glomeruli (fig. 3). A few similar tubules were found at random in other lobules. Adenomatous tissue was found in fairly compact regions, or associated with sarcomatous or vesicular structures (fig. 1), or even imbedded between layers of collagenous connective tissue of the capsule (fig. 4). Sarcomatous nodules were also found imbedded in connective tissue septums. Besides characteristically adenomatous tissue, there were many regions of atypically narrow tubules, or even branching cords of epithelial cells associated with abundant stroma in the pattern of scirrhous carcinoma (fig. 5 and 6).

The sarcomatous regions were sometimes homogeneously composed of undifferentiated cells; more often they were organized into larger or smaller whorls of spindle cells (fig. 7 and 8). Narrow connective tissue septums tended to separate these whorls, but often there was a smooth gradient from such structures to the stroma of the carcinomatous areas.

There were quite a few areas of necrosis, most of them small. These were most commonly in the centers of large sarcomatous whorls (fig. 9), but were also found in carcinomatous zones. Besides debris and pycnotic nuclei of tumor cells, there were some invading leucocytes. Associated with one rather diffuse area of degeneration were found fat cells, and some cells bearing yellow pigment. There was scant indication of hemorrhage.

There was no clear indication of smooth muscle, and no sign at all of cartilage, bone, or striated muscle.

Cytological detail was not too good since the tumor was not fixed until more than 24 hours after slaughter, and not all of the interval was spent in a refrigerator. Only a few mitotic figures were definitely identified, but there were many more figures rendered doubtful by similarity to the frequent pycnotic nuclei.

## REVIEW OF LITERATURE

Embryonal nephroma, or "Wilms' tumor," is not too rare in man, as may be seen from the tables and bibliographies of recent authors. Herzog,[1] with his chief interest in those kidney tumors containing striated muscle, has reviewed more than 130 cases. Not only the pathological and statistical, but also the clinical aspects have been extensively considered.[2, 3]

As to occurrence in domesticated animals, Feldman[4] has summed up his own cases with those in the preceding literature, showing that this embryonal nephroma, as he designates it, has been found in numerous cases in swine and in the domestic fowl, seven times in the rabbit, and once in cattle. Oberling[5] reported another case from a rabbit, and Montpellier[6] added three cases from fowls and referred to others. Nyka[7] reported one case from a horse, and Feldman,[8] one from a sheep.

The frequency of reported cases may differ in various species partly because of different conditions of examination (age at slaughter, etc.), but there are very real specific differences. This might be suspected from the high proportion of embryonal nephromas among tumors of swine, but it is perhaps more clearly seen in a comparison of laboratory stocks of mice and rats. Slye, Holmes and Wells,[9] on the one hand, with 33,000 autopsies of mice dying at all ages found about 5,000 tumors, 16 of the kidney, but no embryonal

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### Captions to figures on opposite page

Fig. 1.—Adenomatous area with wall of vesicle lined by transitional epithelium. x80.

Fig. 2.—Transitional epithelium. x400.

Fig. 3.—Rudimentary glomerulus-like structure in region resembling fetal metanephros. x400.

Fig. 4.—Adenomatous tissue imbedded in capsule. x80.

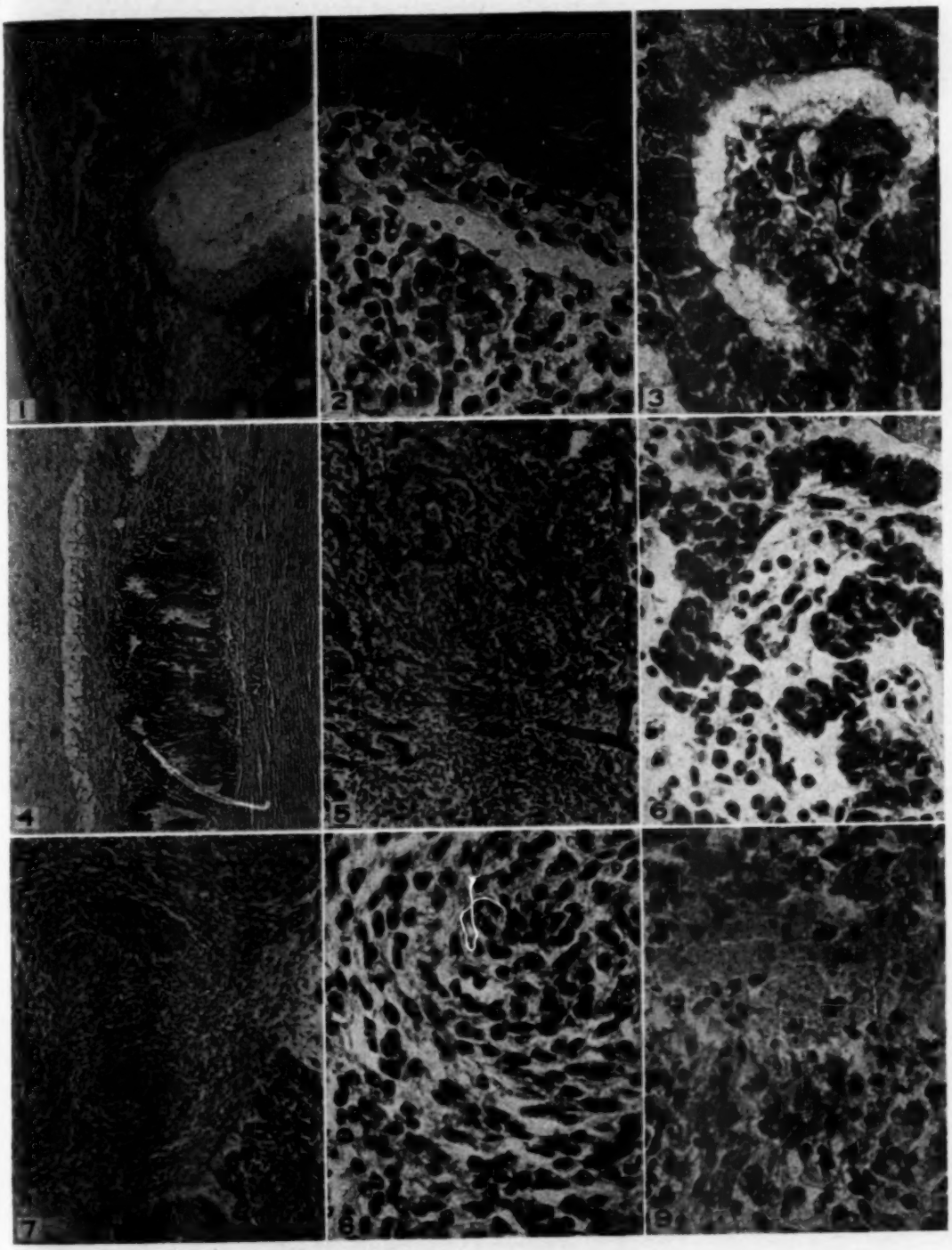
Fig. 5.—Area resembling scirrhous carcinoma. x80.

Fig. 6.—Portion of area shown in fig. 5. x400.

Fig. 7—Sarcomatous tissue showing whorl-like arrangement. x80.

Fig. 8.—Area of spindle cells from field shown in fig 7. x400.

Fig. 9.—Necrotic center of a whorl of sarcomatous tissue. x400.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nephromas. Ratcliffe,[10] and Bullock and Curtis,[11] on the other hand, found that among 273 and 489 rats bearing spontaneous tumors, 4 and 6, respectively, had embryonal nephromas.

In spite of the considerable number of these tumors reported in man and domesticated animals, no clear description has been found of an embryonal nephroma in wild or captive animals. The laboratory rats mentioned above, although their history of domestication is probably even shorter than that of rabbits, still probably belong in the category of domesticated animals from the evolutionary and physiological viewpoints. In about 100,000 wild Norway rats, however, McCoy[12] found 103 tumor bearers with no embryonal nephromas (Woolley and Wherry,[13] in 23,000 wild rats, found three "malignant renal adenomas," in two of which the brief descriptions leave room for at least suspicion of mixed tumors). McCoy,[14] in 250,000 ground squirrels, found a low tumor incidence and no embryonal nephromas. Ratcliffe,[15] in summarizing his work and that of Fox on tumors of captive wild birds and mammals, found very considerable numbers of kidney tumors, some epithelial, some sarcomatous; but in a personal communication he emphasizes that none of these were of the mixed type. Still, it must be recognized that in all the above series of wild animals the conditions of autopsy are different from those in the laboratory or domestic stocks, and that a larger proportion of the young animals which might be affected would not come to autopsy.

## SUMMARY

An embryonal nephroma from a 3-week calf is described; it is believed to be only the second case reported from cattle. It is unusual in being extranephric. The tumor was well encapsulated and weighed 486 Gm. As is customary, the histopathology was that of a chaotic mixture of sarcomatous, renal adenomatous, and carcinomatous tissues, forming lobules. There were groups of small serous cysts lined by transitional epithelium. Unlike some reported cases of embryonal nephroma, no cartilage, bone, or muscle was found. Review of the literature shows that this type of mixed kidney tumor has been frequently reported in man and in swine; less often in domestic fowls, in domestic rabbits and in laboratory rats; quite rarely in sheep, horses and cattle; and perhaps not at all in wild mammals or birds.

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**Quackery in farm animal medicine is a magnificent scheme of sabotage. As a means of giving aid and comfort to the enemy, its rating is high. Feeding parasites (worms, insects, and microbes) instead of soldiers and sailors is a good type of fifth column work.**

# Laboratory Methods for Differentiating Trichomonas Foetus from Other Protozoa in the Diagnosis of Trichomoniasis in Cattle

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JUDGING FROM CERTAIN reports in the literature and from personal contacts with veterinarians, it is our conviction that errors in the diagnosis of bovine trichomoniasis are most commonly due to an inability to recognize the causative flagellate with certainty and distinguish it from other organisms of similar appearance. The purpose of this paper is to present certain laboratory procedures and drawings that may facilitate the differentiation of *Trichomonas foetus* from other protozoan organisms commonly encountered in material sent in for diagnosis.

Protozoa are subdivided into classes partly on the basis of their locomotor structures. The Sarcodina, of which Ameba is the most familiar example, move by pouring themselves forward in liquid lobes of protoplasm called pseudopodia. The Mastigophora, or flagellates, move by whipping themselves along by the lashing of slender, thread-like organelles called flagella. The Ciliata swim by the coördinated waving of an external covering of short, hair-like cilia. The Sporozoa rarely have much power of locomotion and must, therefore, be distinguished by their parasitic habits and their method of reproduction, *i.e.*, the formation of spores. Of the foregoing groups, the ones most likely to be encountered in material sent in for diagnosis of trichomoniasis are certain minute representatives of the flagellate class. Most of these are nonpathogenic species, common in the soil, stagnant water, standing urine, and feces of animals (coprozoic forms). Since these free-living species are very abundant in nature, material sent in to be examined is almost invariably contaminated with one or more of them. Their presence in the sample may easily confuse the examiner if he is not familiar with the general run of the nonparasitic protozoa. Some of these free-living flagellates are close relatives of Trichomonas and have a very similar appearance. This emphasizes the need for care if erroneous diagnoses are to be avoided.

A positive diagnosis of bovine trichomoniasis depends upon the demonstration of living, motile *T. foetus* in the genital exudate of infected animals, or in the tissues or fluids from infected fetuses. Two methods may be used for demonstrating the presence of the trichomonads. If there is a heavy infection, the organisms can usually be seen in direct microscopic examination of the exudate or fetal fluids. If this method gives negative results, it is necessary to prepare artificial cultures and examine them for the organisms after a period of incubation. Both methods, in the end, require the use of the microscope and the recognition of the flagellate.

Some of the papers written on the diagnosis of trichomoniasis imply that the recognition of *T. foetus* is a comparatively simple matter. The wave-like motion of the undulating membrane and the irregular jerky movement of the body and axostyle are often cited as characteristic recognition marks. It is true that an experienced protozoölogist can frequently recognize a particular species in this way, but few veterinarians and diagnosticians have the time, the necessary microscopic equipment, or the protozoölogical background requisite for making a reliable diagnosis on this basis alone. It is not easy to get the mag-

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nification and the lighting just right to see the undulating membrane. Furthermore, several organisms closely related to Trichomonas resemble it so much in shape and movement as to make the differentiation difficult for anyone not constantly working with the various species.

Before outlining the procedure for microscopic identification of Trichomonas, it would be well to describe the techniques used in preparing the artificial cultures. This involves the inoculation of suitable culture mediums with genital exudate from suspected cows or bulls. The culture medium used in this laboratory for field work consists of egg slants made by beating a mixture of 3 eggs with 15 cc. of 0.75 per cent saline solution (Avery and Garlick[1]). About 2 cc. of this mixture are placed in individual tubes and inspissated (coagulated by heat). Then 10 cc. of 0.75 per cent saline solution are added to each, the tubes plugged with cotton and sterilized. Although this medium is not suitable for long-continued cultivation of trichomonads, it is good for ordinary diagnostic procedure. Another medium used with success in this laboratory for maintaining stock cultures is Schneider's citrate medium (Schneider, unpublished thesis)[2]. This consists of slants made of eggs, defibrinated bovine blood, citrate solution and a liquid portion consisting of 5 per cent each of serum, citrate solution, and hematin. In preparing the artificial cultures, some of the material to be examined is inoculated into one of the above mediums. Several tubes are incubated at room temperature and others at 37 C. for 18 to 36 hours. Most free-living protozoan contaminants, to be mentioned in detail later, are unable to withstand the higher incubation temperature, but develop abundantly at room temperature. The trichomonads and several of the free-living types will survive and multiply at body temperature.

It is usually best to use both direct microscopic examination and the cultural method in making a diagnosis of bovine trichomoniasis. When seminal fluid or semen are to be tested, they should not be examined until the spermatozoa have lost their motility. This can be brought about by placing the material in an incubator at 37 C. for 6 to 8 hours, Miller.[3] The spermatozoa by this time will have settled to the bottom, whereas the protozoa, if present, will be found moving about in the supernatant fluid.

A preliminary examination for protozoa may be made by putting a drop of fluid on a slide and examining it under low power for moving flagellates. These can be distinguished from motile bacteria by their larger size, shape, and by the presence of a nucleus. Protozoa are usually as long as or longer than a human red blood corpuscle (7.5$\mu$) and at least half that wide. Protozoa are also inclined to be rounded or spindle-shaped, whereas bacteria are usually minute spheres, rods of uniform diameter, or spiral threads. If further differentiation is desired, an aceto-carmine or methyl-green-acetic stain will nearly always bring out the nucleus of a protozoan, whereas the nucleus is lacking in bacteria. The movements of the two types of organisms are likewise very different. The bacteria, when motile, usually move backward and forward alternately, with equal ease and in a fairly straight course, whereas protozoa tend to move mostly in one direction, with a more variable interrupted movement.

In preparing slides for study under high power or oil immersion lens of the microscope, it has been found convenient to proceed as follows: Place a very small drop (about 2 mm. in diameter) in the center of one-half of the slide and a similar drop on the other. On the one drop, place a coverglass (thin No. 1 coverglasses are essential for oil immersion work). A very thin margin of vaseline placed on the edge of the coverglass before use will seal the preparation, preventing evaporation and steadying the coverglass for oil immersion work. The organisms in the drop are left living. On a

[1]Avery, J., and Garlick, G.: A Simple Medium for Cultural Diagnosis of *Trichomonas foetus* Infection in Cattle. Proc. Helm. Soc. Wash., vii (1940), pp. 27-29.

[2]Schneider, M: *Trichomonas Foetus* in Cattle with Special Reference to Diagnosis. Thesis, Library, Univ. Wis. (1941), pp. 1-33.

[3]Miller, F.: Sterility in the Bull. J.A.V.M.A., c (1942), pp. 147-148.

second coverglass, put a very small drop of saturated aqueous mercuric chloride ($HgCl_2$) solution. Lower this on the second drop of culture in such a way that the killing solution strikes the drop containing the organisms, mixing with it as the coverglass hits the slide. This kills the protozoa without markedly distorting their body shape and without clumping the bacteria too badly about them for study of the flagella.

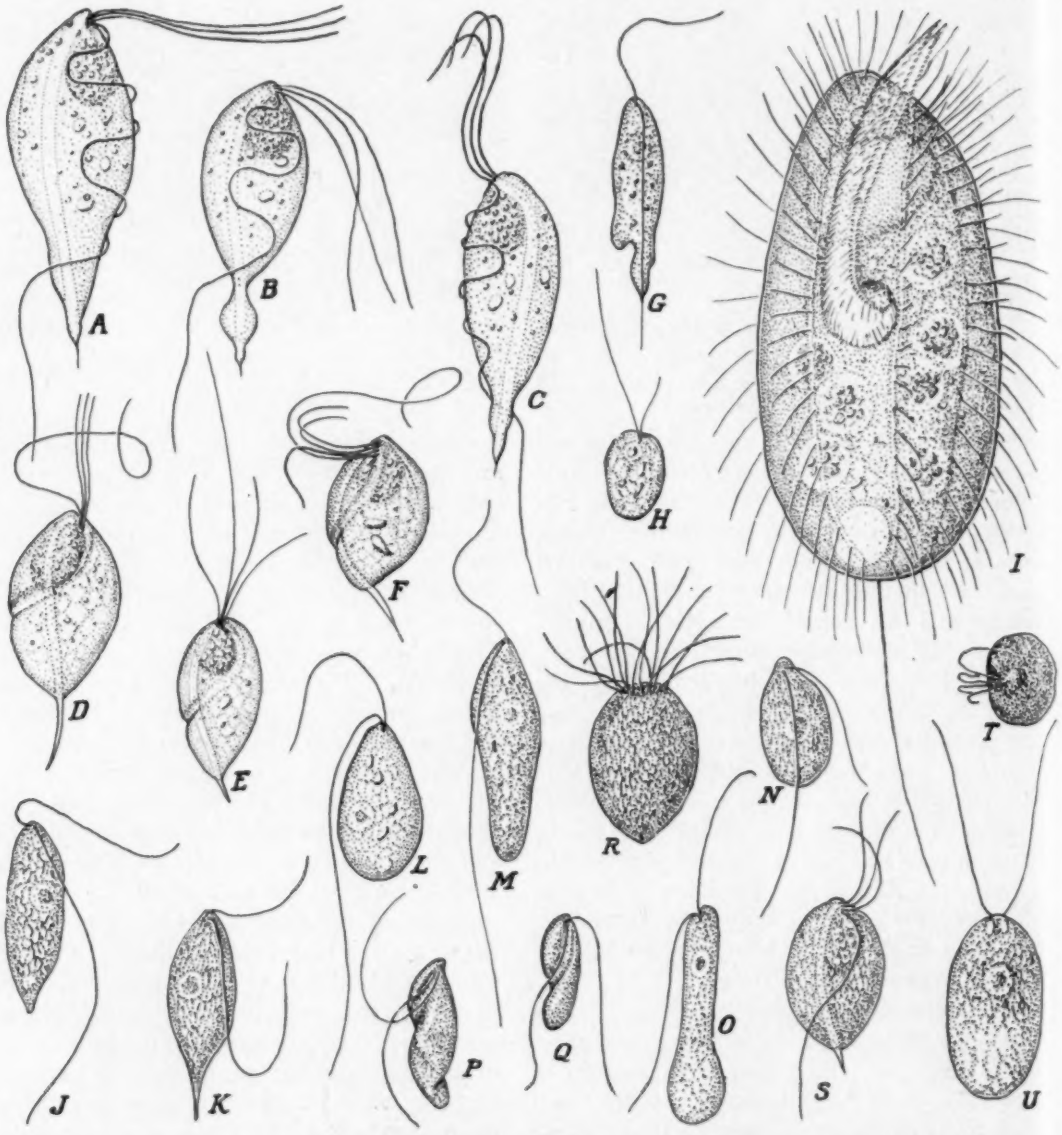
The drop containing the living organisms can now be examined under high power to note the approximate size, appearance, and abundance of the protozoa. They are easier to locate when moving, and once seen are more easily located thereafter on the slide where they have been killed. The living cultures are also useful for noting the characteristic types of movement. The killed organisms should be studied under high power and oil immersion lenses. In the use of oil immersion objectives on fresh mounts like these, it is important that the study be made in the central rather than the marginal region of the coverglass, as in the latter case the oil is likely to run under the coverslip and displace the specimen. Also in such mounts it is advisable to use as little culture and killing fluid as practicable, so that the film to be studied will be thin and the coverglass not floated up so much by the fluid that currents and movements of the coverglass are facilitated.

For determining the size of the organisms, we have used an ocular micrometer disc, units of which had been calibrated against a stage micrometer so that the readings could be converted into microns. However, if such special measuring apparatus is not available, the veterinarian and diagnostician may obtain a fairly accurate estimate of the size of the organisms by proceeding as follows: Before using the coverglass, smear a little streak of human blood on it, using very little blood and spreading it so thin that the corpuscles are scattered. After the streak dries, put the coverglass on the drop of culture in such a way that the film of blood is on the upper side in contact with the air. Under high power, the corpuscles can now be seen very distinctly, and since the protozoa are just underneath the coverglass, while the corpuscles are just above it, only a slight twist of the fine adjustment of the microscope is needed to compare the size of the two. A human red blood corpuscle measures 7.5$\mu$ in diameter, near enough to the size of the protozoans to permit a reasonably accurate estimate of the length of the latter. Other corpuscles than the human may be used as standards of comparison if desired. The sizes of several types are as follows: horse, 5.6$\mu$; mule, 5.3$\mu$; cow, 5.6$\mu$; sheep, 5.0$\mu$; goat, 4.1$\mu$; pig, 6.2$\mu$; dog, 7.3$\mu$; cat, 6.5$\mu$.

In identifying flagellates, it is important to know the number and arrangement of the flagella. This can be done accurately only under the oil immersion lens, since the organisms are usually very minute. Moreover, it is often necessary to examine a considerable number of specimens before one is found in the right position with the flagella properly extended for accurate observation. The axostyle, if present, can usually be seen without staining, and often the position, size, and general appearance of the nucleus can be determined. Of course, prepared stained slides could be made, but the technique is time consuming and the average veterinarian's office is not always equipped for such work.

Materials for diagnosis sent in to or collected by this laboratory include: (1) from the cow and fetus: washings from the vulva, vagina, and uterus, aborted fetuses, samples of fetal stomach fluid, fetal membranes (usually picked up from the ground or from barn gutters), uterine pus, pieces of placenta, amniotic fluid, allantoic fluid; (2) from the bull: washings from the sheath, seminal fluid, semen.

The examination of these materials has yielded a variety of protozoa, mainly flagellates, including: *Trichomonas foetus, Trichomonas ruminantium, Eutrichomastix ruminantium, Bodo foetus, Bodo glissans, Spiromonas angusta, Cercomonas crassicauda, Polytoma uvella, Monas* sp., *Lembus pusillus* (a ciliate), a small amoeboid species, and several other less frequent types. Those most commonly encountered are shown in the accompanying illustrations. Of the types




**Some Protozoa Encountered in Examination of Material Sent in for Diagnosis of Trichomoniasis**

Fig. A-C.—Trichomonas foetus (14-21μ); D-F.—Eutrichomastix? sp. (8-13μ); G.—Cercomonas crassicauda (14μ); H.—Monas obliqua (6μ); I.—Lembus pusillus (33μ); J-O.—different forms of Bodo (8-14μ); P-Q.—Spiromonas angusta (7-9μ); R.—Callimastix sp. (11μ); S.—Eutrichomastix sp. (11μ); T.—same, end view; U.—Polytoma uvella (12μ). All drawings x2000.

named, the first three are the most difficult to tell apart. In the following paragraphs, brief characterizations of the more frequently found Protozoa are given, together with cultural notes and ways of distinguishing them from *T. foetus*.

*T. foetus* can rarely be found after 48 to 72 hours of cultivation in egg-slant medium, either at 30 or 37 C., as bacterial contamination usually kills the organism. Twenty-four hour cultures or less are best for *T. foetus* examination. *Eu.* spp. grows

best in egg slants plus Ringer's solution at 30 C. At 37 C. this organism will die out in about 48 to 72 hours. Bacterial contamination at 30 C. apparently does not hinder the organism. To keep the organism alive, transfers must be made every 7 to 10 days.

*B. foetus*, one of the organisms most commonly found in this laboratory, grows best at 30 C. in egg slant plus Ringer's solution. Bacterial contamination does not inhibit the growth of *B. foetus*. *B. foetus* will die out within 24 to 36 hours at 37 C. Cultures have been kept in this laboratory for 8 months at room temperatures, by making transfers every 7 to 10 days.

*S. angusta, and C. crassicauda*, grow best in Schneider's citrate medium at 30 C. However, the organisms may survive for 4 days at 37 C. These organisms grow quite well with bacterial contamination. These organisms have been kept about 3 months with transfers every 4 days.

*P. uvella* and *L. pusillus* grow abundantly at 30 C. in Ringer's solution. Bacterial contamination is not a factor for keeping these protozoa alive. The diagnostic features of these species are shown in the figures.

## Antiquated (?) Pathology

A precious book in the AVMA library is "Introduction to Pathology and Morbid Anatomy" (456 pages) by T. Henry Green, M.D., Lond., lecturer at Charing Cross Hospital Medical School, Broughton. The fly leaf is inscribed "Jos. Hughes,* Royal Veterinary College, Glasgow, 1880."

The volume signalizes the pathology of the 1870s, that is, the theories of Billroth, Virchow, Villemin, Addison, Cohnheim, Klebs and other figures of medical history who were "not so dumb" as the less thoughtful modernist is apt to suppose, for, by merely replacing such terms as "poison," "poisonous material," "infective substance" *et al.* with the names of the microbes since discovered as the cause of disease, their texts remain remarkably factual for 1941. When microbes, one by one, were indicted during the next two decades, convenient places to insert their names had already been prepared for the bacteriologists. No immediate revolutionary revision was necessary in the subsequent analyses of morbid anatomy, as the old pathologists called the structural alterations brought about by disease.

The 38 fine engravings (on wood) reproduced from drawings leave much less to be desired than many of the photomicrographs of the present time.

This is no *coup de bec* at the modern pathologist. It's a reminder to honor the wisdom of the pioneers.

*Student Hughes of Ireland, upon graduating at the Royal Veterinary College, Glasgow, came to the United States and entered private practice at Walsh's livery stable, 25th St. and Indiana Ave., Chicago. In 1883, along with A. H. Baker (Montreal '76) and R. J. Withers, a medical student, he founded the Chicago Veterinary College.

## The Corn States of America

There is a region of the United States called the Cornbelt. It was so named because the soil therein is favorable for growing the annual grass, *Zea mays*, which in this country is always called corn. The belt lies within the boundaries of Ohio, Indiana, Illinois, Iowa, Nebraska, Kansas, Missouri, Wisconsin, Minnesota, and South Dakota. It completely englobes Iowa but only a part of the others.

The world's annual corn crop is around 4,000,000,000 bushels. The United States alone produces $2,500,000,000 bushels of which two-thirds, or 1,660,000,000 bushels, is grown in the Cornbelt. These figures furnish the reason for mapping out this region as a distinct portion of the earth's arable land. The part corn has played in the drama of this period is the subject of another essay, especially in American history. When Columbus and his quarreling crew came over in 1492, they were the first white men to see an ear of corn. The corn of the aborigines enabled the first settlers to get a foothold and by 1942 it has built up the nation now drawn upon to aid the once cornless people.

# Physiological Chemistry in the Veterinary Colleges in the United States

## 1941-1942

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IN AN ATTEMPT to determine how the work in physiological chemistry required of veterinary students at the State College of Washington compared with that of other institutions in the United States during the school year 1941-1942, a survey of the situation was made during the spring of 1942. A questionnaire was prepared and sent to the dean of each veterinary college, and it was filled out by him or the instructor in charge of the work in physiological chemistry. Because it was considered that the results of this inquiry might be of some value to members of the profession and other interested persons, the information obtained was summarized and is presented below in tabular form.

In this report, no attempt has been made at evaluations of procedures in the several colleges. Nor does it seem desirable to urge upon any institution many revisions of curriculums to make for strict conformity to one plan for the various schools. However, a few observations may be in order.

1) In the majority of instances, quantitative analysis is not a prerequisite for physiological chemistry. In order to permit more satisfactory performance of quantitative clinical procedures in the laboratory part of the physiological chemistry course, the addition of a basic course in this field as a pre-professional requirement or as a part of the work of the first year in the veterinary curriculum would, in the opinion of many, be very desirable.

2) In general, standard textbooks in the field of physiological chemistry are used in the several courses.

3) The procedure of many college instructors of preparing laboratory directions especially adapted to the needs of the students and the facilities of the laboratories is rather common in the work here reviewed.

4) The training of the instructors has been at a variety of institutions and in nearly every period of the twentieth century.

5) In the majority of colleges, the work in physiological chemistry is offered in the chemistry department of that institution with which the veterinary school is affiliated.

6) The data on publications of the various instructors have not been analyzed. The figure in each instance refers only to the number of reports listed for the individual in *Chemical Abstracts* (through 1941). No attempt was made to determine the relationship between a publication and veterinary medicine, to evaluate the individual contribution, or to distinguish between original research, reviews,

From the College of Veterinary Medicine and the Department of Chemistry, State College of Washington.

Footnotes for table on page 17.

[1]Quarter basis after June, 1942; [2]Quarter hours; [3]Optional; [4]Estimated amount of material covered in a course combined with physiology and pharmacology; [5]First quarter; [6]Second quarter; [7]Third quarter; [8]First year; [9]Third year; [10]Approximate division in a 5 quarter hour combined course.

[11]Recalculations from "quarter hours" to "semester hours" have been made where necessary to aid in easier comparisons. The usual procedure of college registrars and similar administrative officers in evaluating college credits has been followed, *viz.*, 1 "quarter hour" is equivalent to 0.67 "semester hours."

[12]A—Anderson, Essentials of Physiological Chemistry; B—Bodansky, Introduction to Physiological Chemistry; D—Dukes, Physiology of Domestic Animals; H—Harrow, Textbook of Biochemistry; H and B—Hawk and Bergeim, Practical Physiological Chemistry; H and S—Harrow and Sherwin, Textbook of Biochemistry; [13]B and H—Bergmann and Hewitt; H—Harrow; H and B—Hawk and Bergeim; Instr—Instructor's own mimeographed laboratory instructions. K—Koch. [14]Reference is made to only the highest degree in course held by the instructor.

TABLE I.—Physiological Chemistry in the Veterinary Colleges of the United States, 1941-1942.

| Institution | Quarter or Semester | Req. Credit, Physiol. Chemistry | Year Taken | Hours per Week | | Chem. Prerequisites | | Total Chem. Req. for Grad. Above Gen. Frosh Chem.[11] | | Text Used[12] | Lab. Book[13] | Instructors | | | | | Publications as Listed in Chemical Abstracts, Through '41 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Degree[14] | | | | |
| | | | | Class | Lab. | Organic | Quant. | Quarter Hours | Semester Hours | | | Rank | Department | | Date[14] | Institution[14] | Total Number | No. in Last 10 Years 1932-1941 |
| A | S[1] | 5[2] | 1 | 4 | 3 | 5[2] | | 10 | 6.7 | H&S | Instr. | Asst. Prof. | Chemistry | Ph.D. | '30 | Wisconsin | 11 | 11 |
| | | | | | | | | | | | | Instr. | Chemistry | M.S. | | Penn. State | | |
| B | S | 5 | 1 | 3 | 4 | 5 | | | 10 | H | Instr. | Asst. Prof. | Chemistry | B.S. | '27 | Colo. State | | |
| C | Q | 5 | 1 | 3 | 6 | 5 | | 10 | 6.7 | B | H & B | Instr. | Chemistry | Ph.D. | '41 | Iowa State | 5 | 5 |
| D | S | 5[3] | X[3] | 3 | 6 | 5 | 5 | | 15 | B | K | Prof. | Chemistry | Ph.D. | '17 | Ohio State | 59 | 40 |
| | | | | | | | | | | | | Asst. Prof. | Chemistry | Ph.D. | '31 | Chicago | 11 | 11 |
| E | Q | 9 | 1 | 2-<br>1-<br>2- | 4[5]<br>6[6]<br>4[7] | 3 | 3 | 15 | 10 | A or H&B | Instr. | Prof. | Chemistry | Ph.D. | '25 | Wisconsin | 12 | 5 |
| | | | | | | | | | | | | Assoc. Prof. | Chemistry | M.S. | '24 | Minnesota | 4 | 2 |
| | | | | | | | | | | | | Instr. | Chemistry | M.S. | '30 | Kansas State | | |
| F | S | 6 | 1 & 3 | 2- | 4.6[8]<br>9.3[9] | 5 | | | 11 | B | Instr. | Prof. | Vet. Physiol. | D.V.M. | '14 | Cornell | 18 | 14 |
| | | | | | | | | | | | | Instr. | Vet. Physiol. | D.V.M. | '41 | Kansas State | | |
| G | Q | 3 | 1 | 1 | 6 | 3[10] | 2[10] | 8 | 5.3 | H | H | Prof. | Ag. Chem. | Ph.D. | '09 | Yale | 19 | 5 |
| | | | | | | | | | | | | Prof. | Ag. Chem. | Ph.D. | '22 | Ohio State | 2 | |
| H | S | 6 | 1 | 3 | 9 | 4 | | | 10 | H | W | Asst. Prof. | Physiol. Chem. | Ph.D. | '24 | Wisconsin | 25 | 14 |
| | | | | | | | | | | | | Asst. Instr. | Physiol. Chem. | B.S. | '39 | Haverford | 5 | 5 |
| I | S | 5[4] | 1 & 2 | 3[4] | 6[4] | 4 | | | 9 | D | B & H<br>H & B | Prof.<br>Asst. Prof.<br>Instr. | Vet. Physiol.<br>and<br>Pharma. | D.V.M.<br>M.S.<br>D.V.M. | '26<br>'38<br>'40 | Texas A. & M.<br>Texas A. & M.<br>Michigan St. | | |
| J | S | 4 | 1 | 2 | 6 | 3 | | | 7 | H&B | H & B | Asst. Prof. | Chemistry | Ph.D. | '35 | Iowa | 11 | 11 |

# Physiological Chemistry in the Veterinary Colleges in the United States

## 1941-1942

E. E. WEGNER, B.S., D.V.M., and STEWART E. HAZLET
*Pullman, Washington*

IN AN ATTEMPT to determine how the work in physiological chemistry required of veterinary students at the State College of Washington compared with that of other institutions in the United States during the school year 1941-1942, a survey of the situation was made during the spring of 1942. A questionnaire was prepared and sent to the dean of each veterinary college, and it was filled out by him or the instructor in charge of the work in physiological chemistry. Because it was considered that the results of this inquiry might be of some value to members of the profession and other interested persons, the information obtained was summarized and is presented below in tabular form.

In this report, no attempt has been made at evaluations of procedures in the several colleges. Nor does it seem desirable to urge upon any institution many revisions of curriculums to make for strict conformity to one plan for the various schools. However, a few observations may be in order.

1) In the majority of instances, quantitative analysis is not a prerequisite for physiological chemistry. In order to permit more satisfactory performance of quantitative clinical procedures in the laboratory part of the physiological chemistry course, the addition of a basic course in this field as a pre-professional requirement or as a part of the work of the first year in the veterinary curriculum would, in the opinion of many, be very desirable.

2) In general, standard textbooks in the field of physiological chemistry are used in the several courses.

3) The procedure of many college instructors of preparing laboratory directions especially adapted to the needs of the students and the facilities of the laboratories is rather common in the work here reviewed.

4) The training of the instructors has been at a variety of institutions and in nearly every period of the twentieth century.

5) In the majority of colleges, the work in physiological chemistry is offered in the chemistry department of that institution with which the veterinary school is affiliated.

6) The data on publications of the various instructors have not been analyzed. The figure in each instance refers only to the number of reports listed for the individual in *Chemical Abstracts* (through 1941). No attempt was made to determine the relationship between a publication and veterinary medicine, to evaluate the individual contribution, or to distinguish between original research, reviews,

From the College of Veterinary Medicine and the Department of Chemistry, State College of Washington.

**Footnotes for table on page 17.**

[1]Quarter basis after June, 1942; [2]Quarter hours; [3]Optional; [4]Estimated amount of material covered in a course combined with physiology and pharmacology; [5]First quarter; [6]Second quarter; [7]Third quarter; [8]First year; [9]Third year; [10]Approximate division in a 5 quarter hour combined course.

[11]Recalculations from "quarter hours" to "semester hours" have been made where necessary to aid in easier comparisons. The usual procedure of college registrars and similar administrative officers in evaluating college credits has been followed, *viz.*, 1 "quarter hour" is equivalent to 0.67 "semester hours."

[12]A—Anderson, Essentials of Physiological Chemistry; B—Bodansky, Introduction to Physiological Chemistry; D—Dukes, Physiology of Domestic Animals; H—Harrow, Textbook of Biochemistry; H and B—Hawk and Bergeim, Practical Physiological Chemistry; H and S—Harrow and Sherwin, Textbook of Biochemistry; [13]B and H—Bergmann and Hewitt; H—Harrow; H and B—Hawk and Bergeim; Instr—Instructor's own mimeographed laboratory instructions. K—Koch. [14]Reference is made to only the highest degree in course held by the instructor.

TABLE I.—Physiological Chemistry in the Veterinary Colleges of the United States, 1941-1942.

| Institution | Quarter or Semester | Req. Credit, Physiol. Chemistry | Year Taken | Hours per Week | | Chem. Prerequisites | | Total Chem. Req. for Grad. Above Gen. Frosh Chem.[11] | | Text Used[12] | Lab. Book[13] | Instructors | | | | | Publications as Listed in Chemical Abstracts, Through '41 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Degree[14] | | | | |
| | | | | Class | Lab. | Organic | Quant. | Quarter Hours | Semester Hours | | | Rank | Department | | Date[14] | Institution[14] | Total Number | No. in Last 10 Years 1932-1941 |
| A | S[1] | 5[2] | 1 | 4 | 3 | 5[3] | | 10 | 6.7 | H&S | Instr. | Asst. Prof. | Chemistry | Ph.D. | '30 | Wisconsin | 11 | 11 |
| | | | | | | | | | | | | Instr. | Chemistry | M.S. | | Penn. State | | |
| B | S | 5 | 1 | 3 | 4 | 5 | | | 10 | H | Instr. | Asst. Prof. | Chemistry | B.S. | '27 | Colo. State | | |
| C | Q | 5 | 1 | 3 | 6 | 5 | | 10 | 6.7 | B | H & B | Instr. | Chemistry | Ph.D. | '41 | Iowa State | 5 | 5 |
| D | S | 5[2] | X[2] | 3 | 6 | 5 | 5 | | 15 | B | K | Prof. | Chemistry | Ph.D. | '17 | Ohio State | 59 | 40 |
| | | | | | | | | | | | | Asst. Prof. | Chemistry | Ph.D. | '31 | Chicago | 11 | 11 |
| E | Q | 9 | 1 | 2-<br>1-<br>2- | 4[5]<br>6[6]<br>4[7] | 3 | 3 | 15 | 10 | A or H&B | Instr. | Prof. | Chemistry | Ph.D. | '25 | Wisconsin | 12 | 5 |
| | | | | | | | | | | | | Assoc. Prof. | Chemistry | M.S. | '24 | Minnesota | 4 | 2 |
| | | | | | | | | | | | | Instr. | Chemistry | M.S. | '30 | Kansas State | | |
| F | S | 6 | 1 & 3 | 2- | 4.6[8]<br>9.3[9] | 5 | | | 11 | B | Instr. | Prof. | Vet. Physiol. | D.V.M. | '14 | Cornell | 18 | 14 |
| | | | | | | | | | | | | Instr. | Vet. Physiol. | D.V.M. | '41 | Kansas State | | |
| G | Q | 3 | 1 | 1 | 6 | 3[10] | 2[10] | 8 | 5.3 | H | H | Prof. | Ag. Chem. | Ph.D. | '09 | Yale | 19 | 5 |
| | | | | | | | | | | | | Prof. | Ag. Chem. | Ph.D. | '22 | Ohio State | 2 | |
| H | S | 6 | 1 | 3 | 9 | 4 | | | 10 | H | W | Asst. Prof. | Physiol. Chem. | Ph.D. | '24 | Wisconsin | 25 | 14 |
| | | | | | | | | | | | | Asst. Instr. | Physiol. Chem. | B.S. | '39 | Haverford | 5 | 5 |
| I | S | 5[4] | 1 & 2 | 3[4] | 6[4] | 4 | | | 9 | D | B & H<br>H & B | Prof.<br>Asst. Prof.<br>Instr. | Vet. Physiol.<br>and<br>Pharma. | D.V.M.<br>M.S.<br>D.V.M. | '26<br>'38<br>'40 | Texas A. & M.<br>Texas A. & M.<br>Michigan St. | | |
| J | S | 4 | 1 | 2 | 6 | 3 | | | 7 | H&B | H & B | Asst. Prof. | Chemistry | Ph.D. | '35 | Iowa | 11 | 11 |

or summaries. When an individual is not credited with any publications, it does not indicate that he was not actively engaged in research in some other field. To restate the point, "Number of publications" lists only the number of reports abstracted by the standard chemical abstract journal of the United States, and in a rough way indicates something indirectly of the research activity of the individual or laboratory concerned.

7) Because of differences in situations at the several colleges, no calculations of averages have been attempted.

For obvious reasons, the names of institutions have been omitted from this report. The authors will be glad to refer any questions or comments to the deans of the colleges concerned.

Acknowledgment of the coöperation of the deans of the veterinary schools is gladly made.

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# The Longevity of Encephalomyelitis Immunity Induced in Horses by Vaccination

H. W. SCHOENING, V.M.D., M. S. SHAHAN, D.V.M.,
L. T. GILTNER, D.V.M., and O. L. OSTEEN, D.V.M.
*Washington, D. C.*

THERE IS no longer any question as to the merit of formolized chick embryo vaccine[1] as a preventive of equine encephalomyelitis. The experimental and field evidence that has accumulated is definite on this point.[2, 3, 4, 5, 6, 7, 8] Questions as to how, when, and where to administer encephalomyelitis vaccine do arise, however. Horse owners and veterinarians frequently inquire about the duration of immunity resulting from vaccination.

In tests reported in 1939 by Schoening,[6] it was shown that measurable immunity resulting from subcutaneous vaccination persisted in some horses for as long as a year. The results of these tests may be summarized as follows:

Nine horses were vaccinated with two 10-cc. doses of vaccine 7 days apart. Three horses were exposed by intracerebral inoculation of homologous western type virus 3 months after completion of vaccination, 3 horses were exposed after 6 months and 3 were exposed after 12 months. Three control horses were exposed at the same time in each test. Two of 3 horses at 3 months postvaccination, all of 3 at 6 months, and 2 of 3 at 12 months after vaccination survived without symptoms, whereas all control horses developed encephalomyelitis. In this test, vaccine was administered subcutaneously in 10-cc. doses, a procedure which has been found to be dangerous when generally applied in the field.[9]

Studies were then made (1940) of intradermic vaccination[7] as a means of immunizing without the dangers of severe local reactions or death. No serious reactions attended this method of immunization, and the degree of protection that resulted from two 1-cc. intradermic doses with comparable to that obtained by administering two 10-cc. doses of the same vaccine subcutaneously. The maximum interval between vaccination and exposure in these tests was 97 days. In the tests reported here, we extended this interval to 8 months in one test and 13 months in the other.

Twelve horses were vaccinated in 1940 with western type vaccine; 6 were given 20 cc. subcutaneously, divided into two doses of 10 cc. each, 7 days apart; and 6 re-

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The authors are indebted to Drs. L. O. Mott and R. L. Knudson for valuable aid in carrying out the tests here reported.

ceived 2 cc. intradermically in two doses of 1 cc. each, also 7 days apart. Three subcutaneously-vaccinated horses, 3 vaccinated intradermically, and 6 unvaccinated controls, including 2 titration horses, were exposed intracerebrally approximately 8 months after completion of vaccination. The remaining 6 vaccinated horses and 6 unvaccinated controls, including 3 titration horses, were exposed in the same way approximately 13 months after completion of vaccination. The details and results of this test are summarized in table 1.

The results given in table 1 support previous evidences of the efficacy of intradermic vaccination[7] and show that immunity resulting from this mode of administration persists in a measurable degree for at least 13 months. There are indications, however, that immunity may be waning after the lapse of so long a time, since 2 of the 3 intradermically vaccinated horses did develop symptoms and only one recovered. Also 1 of the 3 subcutaneously-vaccinated horses developed symptoms, but recovered. In contrast with the results of previously reported comparative tests of subcutaneous and intradermic vaccination,[7] the results here reported appear to favor subcutaneous vaccination slightly, but, con-

TABLE 1.—Encephalomyelitis Immunity of Horses 8 and 13 Months After Vaccination.

| No. of Horses | Vaccination[1] | | Exposure[2] | | Results[3] | | |
|---|---|---|---|---|---|---|---|
| | Date | Method | Date | Virus dilution | Developed E.M. | Died E.M. | Protection |
| 3 | 9/17-24/40 | S.C. | 5/20/41 | 1/5,000 | 0 | 0 | 3/3 |
| 3 | 9/17-24/40 | I.D. | 5/20/41 | 1/5,000 | 1 | 1 | 2/3 |
| 4 | ..... | ... | 5/20/41 | 1/5,000 | 4 | 4 | 0/4 |
| 1 | ..... | ... | 5/20/41 | 1/10,000 | 1 | 1 | 0/1 |
| 1 | ..... | ... | 5/20/41 | 1/20,000 | 1 | 1 | 0/1 |
| 3 | 9/17-24/40 | S.C. | 10/23/41 | 1/5,000 | 1 | 0 | 3/3 |
| 3 | 9/17-24/40 | I.D. | 10/23/41 | 1/5,000 | 2 | 1 | 2/3 |
| 3 | ..... | ... | 10/23/41 | 1/5,000 | 3 | 3 | 0/3 |
| 1 | ..... | ... | 10/23/41 | 1/10,000 | 1 | 1 | 0/1 |
| 1 | ..... | ... | 10/23/41 | 1/50,000 | 1 | 1 | 0/1 |
| 1 | ..... | ... | 10/23/41 | 1/100,000 | 0 | 0 | 1/1[4] |

[1]S.C. = subcutaneously; I.D. = intradermically.

[2]Virus used—western type encephalomyelitis (E.M.) virus recovered in 1939 from Iowa horse; brains from 22nd intracerebral passage in guinea pigs used 5/20/41, 29th passage in guinea pigs used 10/23/41. Virus for 5/20/41 exposure harvested 5/5/41 and held in refrigerator in buffered glycerine solution until 5/20/41. During this period of storage, 2 intracerebral titrations were made in guinea pigs (2 to each dilution) and 1 intracerebral titration was made in horses (1 horse to each dilution), and the virus finally used in the horse exposure on 5/20/41 was also titrated in guinea pigs (2 to each dilution). Through these titrations, the minimum lethal dose (m.l.d.) for the guinea pig was determined to be 0.1 cc. (the standard dose) of 1/300,000 dilution of brain in chilled physiological salt solution. The two horses injected intracerebrally with 0.5 cc. (the standard dose) of 1/5,000 and 1/10,000 dilutions in a preliminary titration both developed the disease and died. Thus the exposure dose (0.5 cc.) given the horse on 5/20/41 contained at least 300 guinea pig m.l.d, and, since a 1/20,000 dilution caused the disease in a horse included among the controls in the test, at least 4 horse m.l.d.

The 29th passage virus used in the exposure of horses on 10/23/41 was harvested on 10/13 and 10/14/41, and was stored like that used in the horse exposure of 5/23/41. A preliminary titration in guinea pigs during the storage period and another with the virus used as inoculum in the horse exposure (0.5-cc. dose) showed the m.l.d. for guinea pigs to be 0.1 cc. of a 1/400,000 dilution, on which basis it was concluded that the horses in the 10/23/41 test received at least 400 guinea pig m.l.d. On the basis of the titration in the control horses, it was apparent that the horses exposed received at least 10 horse m.l.d.

[3]All horses that developed fever and other definite symptoms of encephalomyelitis, whether mild or marked, are listed in the column headed "Developed E. M." Two of these, 1 subcutaneously vaccinated and 1 intradermically vaccinated, developed symptoms, but recovered. Horses listed in the column headed "Died E. M." in some cases were destroyed when prostrate.

Protection is expressed fractionally; the denominator indicates the number of horses injected, the numerator, those that recovered.

[4]This animal subsequently withstood intracerebral inoculation of 5,000 guinea pig m.l.d. of western E. M. virus (3/24/42), and, therefore, it is concluded that the animal was either immune at the time of the first inoculation (10/23/41), or acquired immunity therefrom.

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| 3 | 9/17-24/40 | I.D. | 5/20/41 | 1/5,000 | 1 | 1 | 2/3 |
| 4 | ..... | ... | 5/20/41 | 1/5,000 | 4 | 4 | 0/4 |
| 1 | ..... | ... | 5/20/41 | 1/10,000 | 1 | 1 | 0/1 |
| 1 | ..... | ... | 5/20/41 | 1/20,000 | 1 | 1 | 0/1 |
| 3 | 9/17-24/40 | S.C. | 10/23/41 | 1/5,000 | 1 | 0 | 3/3 |
| 3 | 9/17-24/40 | I.D. | 10/23/41 | 1/5,000 | 2 | 1 | 2/3 |
| 3 | ..... | ... | 10/23/41 | 1/5,000 | 3 | 3 | 0/3 |
| 1 | ..... | ... | 10/23/41 | 1/10,000 | 1 | 1 | 0/1 |
| 1 | ..... | ... | 10/23/41 | 1/50,000 | 1 | 1 | 0/1 |
| 1 | ..... | ... | 10/23/41 | 1/100,000 | 0 | 0 | 1/1[4] |

[1]S.C. = subcutaneously; I.D. = intradermically.

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The 29th passage virus used in the exposure of horses on 10/23/41 was harvested on 10/13 and 10/14/41, and was stored like that used in the horse exposure of 5/23/41. A preliminary titration in guinea pigs during the storage period and another with the virus used as inoculum in the horse exposure (0.5-cc. dose) showed the m.l.d. for guinea pigs to be 0.1 cc. of a 1/400,000 dilution, on which basis it was concluded that the horses in the 10/23/41 test received at least 400 guinea pig m.l.d. On the basis of the titration in the control horses, it was apparent that the horses exposed received at least 10 horse m.l.d.

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sidering the few animals in the test, the apparent difference is probably of no significance.

The prevailing practice in the field has been to recommend revaccination of exposed animals annually. This is in accord with all the available evidence from tests in guinea pigs and horses, which indicates that there is a gradual decline in the resistance that results from vaccination. Some horses may retain considerable immunity for more than a year, especially if exposed to the disease during that time, but this cannot be depended upon in a practical way.

According to the reports received by the Bureau of Animal Industry each year for compilation of epizoötiological data on encephalomyelitis, most of the vaccine is administered only after the disease makes its appearance in the locality or on the particular farm. If vaccination is done early enough under these circumstances, some direct benefit may be expected, but it is certainly better that vaccination be effected before the disease makes its appearance. On the average farm, where usually one or two horses develop frank encephalomyelitis in a given season, a variable number of the others there may reasonably be assumed to have been immunized by inapparent infections. How long this resistance persists is not definitely known, but that it probably lasts for several years is evidenced by the fact that horses over 2 years of age in areas where the disease appears year after year are comparatively rarely attacked. In the early 1930's, before the disease had become so widespread, there was no such apparent difference in the susceptibility of young and old animals. The young animals are the ones, then, which especially need vaccination from the standpoint of control of the disease.

There can be no question as to the overall benefit from vaccination in the control of equine encephalomyelitis. But it is apparent that the degree of benefit is in relation to the time of vaccination and the extent to which it is applied. As it is being practiced today, vaccination is a stopgap measure which cannot be expected to eradicate the disease. Eradication through vaccination could only be expected if every susceptible horse and mule were immunized annually for several years. After the immunizing effects of previous epizoötics and general vaccination were lost, there would be again a corresponding population of susceptible animals. With every discovery of another naturally affected species, the diffusion of the possible reservoirs for perpetuation of the virus becomes more and more apparent and challenging.

Until recently, vaccination in the West implied the use of western type vaccine, and eastern type vaccine was used only on the eastern coast. Now, however, both types of virus are known to have existed in Alabama,[10] and last year eastern type virus was identified in Texas,[11, 12] where, as in other areas along the Gulf of Mexico, it had been suspected for some time. In addition, 2 strains of eastern virus were recovered from cases occurring well inland in Texas,[12] and there is strong suspicion that this type of the disease may be spreading elsewhere. Definite knowledge of the type of virus operating each year in epizoötic areas thus has become of even more than usual importance. How else can proper vaccination procedures be currently applied? There is also the chance that still other immunologic types of virus may be evolved. Finally, St. Louis encephalitis must be considered in this connection.

In several sections of the country where both types of virus are known to exist, or where the type of virus is unknown, or when animals are to be moved from one region to another, the advised course is to use vaccine of both types simultaneously or to use bivalent vaccine. On the basis of past experience, 2 cc. of bivalent vaccine instead of 1 cc., as in the case of univalent product, is required. This dose has been injected intradermically by the writers into a number of previously vaccinated horses at one or two sites without any severe swellings or other reactions. It is our understanding that the Army has employed this dosage in a great many animals without any bad after effects.

The final solutions of the problems of control and eradication of equine encephalo-

myelitis would appear to rest upon natural epizoötiological factors, as well as, or rather than upon artificial immunologic procedures.

SUMMARY

Three horses given 2 subcutaneous 10-cc. doses of western equine encephalomyelitis vaccine and 2 or 3 horses given the same vaccine intradermically in 2 doses of 1 cc. each survived intracerebral inoculation of encephalomyelitis virus 8 months afterward. The results were the same when the same number of similarly treated horses were exposed 13 months after vaccination, though there were indications that the immunity was waning at the later time.

A brief, general discussion of the subject of vaccination against the disease is offered.

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## The American Farm in World War II

Not the least war effort is the five million dollars worth of food sent abroad every day. The only clouds in that horizon are the possible shortage of farm hands and farm machinery in 1943. Tanks, airplanes and ammunition are put above instead of parallel to food, the "implement" that will actually win this war, and that is not a wild guess if the wartime eventualities since Hammurabi have taught anything. A grim fact in this respect is cutting down the appropriations of the USDA by the Congress, in its wild slashings at spending.

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## Health and National Strength

There are 25,800,000 persons of draft age (20 to 44) in the United States. If the death rate of 1900 had prevailed until the present time, says the *Journal of the American Medical Association*, 2,838,000, or 11 per cent of these, would not be living. In fact, some of the men now living would never have been born. Their parents would have been among the victims of the 1900 death rate. Thus, improvement of public health is furnishing nearly 3,000,000 soldiers to the war effort.

These figures, based as they are upon correct arithmetic, turn the mind to what our food situation would be if the health of farm animals which existed in 1900 had not been improved—if anthrax, hog cholera, blackleg, tick fever, tuberculosis, scabies, and worm parasites had been left to the system of disease control which the farm bureaus are now trying to foist upon the American people.

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On January 17, 1912, Dr. Alexis Carrel snipped a piece of heart muscle from the heart of a chick embryo and popped it into a bottle filled with an elixir of vital juices. A fortnight ago in the Lederle Laboratories at Pearl River, N. Y., the same piece of chicken tissue—or rather its descendant cells—passed its thirtieth anniversary, still alive and growing.—*Pathfinder.*

# 'Sulfasuxidine' Succinylsulfathiazole in Veterinary Practice

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RESEARCH WORKERS are seeking to introduce new sulfonamide compounds and to establish the facts as to their bacteriostatic selectivity. Sulfanilamide is recognized as a streptococcide, while sulfapyridine is bacteriostatic to pneumococci, gonococci, and meningococci. Sulfathiazole appears to have somewhat greater activity against staphylococci, while sufaguanidine appears to have some limited activity on pathogenic intestinal flora. Sulfadiazine may be used with general therapeutic benefit in any of the above pathogenic groupings except the intestinal bacilloses.

Inasmuch as dogs and cats, particularly during summer months, suffer from food poisonings and bacillary dysenteries caused by a pathogenic flora similar to that encountered in the human dysenteries, it follows that some light might be thrown on the enteric problem by clinical studies in selected cases encountered in small animal practice. Diarrheas are common amongst young puppies, usually from so-called "pet shop infection." These were formerly fatal, with a mortality up to 90 per cent. Diarrheas in older dogs were checked by astringent drugs, or by drugs which depress the splanchnic nerves affecting smooth muscle and thus slow up peristalsis, or by oils which cover the epithelial cells lining the alimentary canal. No effort was made to counteract directly the pathogenic bacteria causing the dysentery because there was no such agent as an intestinal antiseptic aside from the old drug, salol, or possibly quinine. Specific bacteriophages were tried and proved beneficial in the Shigella dysenteries. The nearest approach to direct bactericidal therapy came with the use of bacterial antagonism—implanting lactic acid bacteria, *Lactobacillus acidophilus*, and *Lactobacillus bulgaricus* and other antagonistic flora in the intestinal tract.

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The above considerations prompted an investigation of a new sulfonamide derivative, succinylsulfathiazole, said to have marked bacteriostatic action in the intestinal tract. The bacteriostatic action of sulfonamides in combating intestinal pathogens involves the question of their effect on the normal and useful flora of the alimentary canal. Further laboratory-controlled checks might prove worth while. We plated out some washings from canine feces, using 0.1 cc. of 1 : 100 solution, and made differential and numerical colony counts on selenite F and eosin methylene blue plates and transplanted them to fermentation tubes after a period of three days. The number of coliform colonies and the total bacterial count is reduced following therapeutic doses of succinylsulfathiazole. It has been reported[1] that this bactericidal action is marked; a reduction in the coliform count from an average normal flora of 10,000,000 to less than 1,000 organisms per Gm. of wet stool was found. The feces become semifluid and practically odorless under these conditions. However, conditions change so rapidly in the intestinal flora from other causes, that we hesitated to draw even tentative conclusions. It is suggested that further investigations be undertaken both *in vitro* and *in vivo* on this problem.

Sulfapyridine, sulfathiazole, and sulfadiazine were so definitely useful therapeutically in treating cases of canine and feline distemper[2, 3, 4, 5, 6] that succinylsulfathiazole was given controlled tryouts in this group of virus diseases. Also, as sulfaguanidine was found to be of value in enteric infections, salmonelloses, food poisoning, etc., of the dog and cat[7] succinylsulfathiazole was tried in these types of diseases.

## TOXICITY

Succinylsulfathiazole, from a clinical standpoint, appears to be relatively nontoxic in comparison with other sulfonamides. The drug is poorly absorbed (a

dose of 1 Gm. per kg. daily will produce a blood concentration of 3.5 mg. of sulfathiazole and 5.0 mg. of succinylsulfathiazole per 100 cc.[8]). Regardless of the dose, no acute toxicity was noted after oral administration. When we doubled the therapeutic dose of the drug, in no instances did we observe any evidence of hematuria, anemia, or emesis, particularly when used in enteric bacilloses.

Welch, Mattis and Latven,[9] reported the administration of the drug to monkeys for 30 days in daily doses up to 5 Gm. per kg. of body weight in 6 divided doses, with no toxic manifestations or histopathological changes being observed. Poth[8] reported the administration of the drug to dogs daily for 35 days at a dose of 1 Gm. per kg. of body weight divided into 6 doses administered every 4 hours, during which time the dogs ate regularly, gained weight, and showed no tissue changes on gross and microscopical examination. They also report that concretions of the drug in the kidneys and bladder did not occur.

### POSOLOGY

We used the drug in doses depending upon the size and weight of the animal. Cats received 10 gr. a day divided and administered at 4-hour intervals; Pekinese, Pomeranians, Fox and Rat Terriers, 15 to 20 gr. per day divided into 4 or 6 doses; medium-sized dogs, such as Spitz, Wire-haired Fox Terriers, Bostons, up to 30 gr. a day; while Shepherds, Collies, Great Danes and Saint Bernards received as high as 60 gr. a day. In general, we allowed between 0.25 and 0.5 Gm. per kg. of body weight per day divided and administered in 4 or 6 doses. Two or more times this amount can be given in intestinal bacillary infections without any toxic symptoms occurring.

In clinically evaluating the bacteriostatic effectiveness of these sulfa drugs, a fall in temperature, normal pulse and respiration are the general objective signs to be desired. In addition, improved appetite, cessation of the symptoms characteristic of the special type of disease from which the animal is suffering should be attained.

### CATARRHAL AND RESPIRATORY DISTEMPER

In the catarrhal, respiratory, and skin forms of distemper, the temperature is usually normal at the expiration of two or three days of sulfonamide treatment. This was not the case with succinylsulfathiazole therapy. Seven cases of distemper were treated with nothing else but this drug in appropriate dosages. The dogs and cats did not get any worse, and the disease did not progress; but it was noticed that the temperature failed to go down at the expiration of two or three days of treatment. As a control measure, we used sulfadiazine and sulfathiazole on some dogs suffering from the same form of distemper and coming from the same neighborhood; in these dogs the temperature fell. We may, therefore, draw tentative conclusions regarding succinylsulfathiazole therapy, by stating that the drug definitely retards the progress of distemper but does not bring about a prompt or complete cure of the disease. These results are to be expected, inasmuch as the drug is poorly absorbed and, therefore, produces no generalized systemic effects.

### INTESTINAL DISTEMPER—CANINE

It is in this form of the disease that succinylsulfathiazole was given most careful clinical observation. Previous literature[1, 8] indicates that this drug has a selective action on the bacterial flora of the intestinal tract. We, therefore, used it extensively in all cases of the intestinal form of distemper.

Here, the results obtained were encouraging. In pups under 2 months of age, particularly when brought from a pet shop or taken from their mothers too early, diarrheas would generally result fatally, or leave them with such lowered resistance that they would subsequently develop encephalitis and die. In puppy diarrhea, a sulfonamide drug with selective action on the intestinal pathogens, which is also nontoxic, is obviously indicated.

We have treated about 3 pups suffering from diarrhea with 2- to 3-gr. doses of succinylsulfathiazole, administering the drug 4 or 6 times a day until the diarrhea was checked. If treated in the early stages,

such cases would recover within 3 or 4 days. The diarrhea would rapidly clear up and the animal would return to normal within a few days. Their appetites soon became good and they would make an uneventful recovery. However, in cases of extreme dehydration, saline therapy was a necessary adjunct. The prognosis in this type of case is unfavorable.

## FELINE DIARRHEAS

Cats and kittens are subject to bacillary dysentery and, because of the obnoxious penetrating odor of the feces, they are unpleasant to hospitalize or treat at home. However, cats respond to succinylsulfathiazole therapy in dosages up to 20 gr. daily, divided and administered 4 to 6 times a day.

### CASE REPORTS—CANINE

*Case 1.*—Distemper of the catarrhal and intestinal type with a watery black diarrhea: A German Shepherd dog 19 months old weighing 35 pounds had a temperature on admission of 104.2 F. Local treatment was applied to the eyes, and succinylsulfathiazole was administered orally in a doze of 7.5 gr. every 4 hours. This medication was continued for 3 days, during which time the dog made an uneventful recovery.

*Case 2.*—Food poisoning: A 4-year-old Newfoundland was presented, with a history of having eaten garbage, kitchen refuse, etc. The dog showed an eczematous rash of allergic type, together with profuse diarrhea. The diarrhea was blood-tinged and black, suggestive of hemorrhagic bacillary dysentery. This was accompanied with borborygmus and halitosis. The temperature was 102.5 F. Succinylsulfathiazole was administered in 11-gr. doses every 4 hours for 2 days and then reduced to 7.5 gr. every 4 hours for 1 day. There was a gradual subsidence of the symptoms; the diarrhea and odor disappeared, and the dog recovered without further treatment.

*Case 3.*—Distemper with typical secondary infection. This was a Fox Terrier about 1 year old, sick for a week before treatment. Rhinitis, laryngitis, conjunctivitis, bronchitis and diarrhea were present. The catarrhal symptoms were treated topically with 10 per cent argyrol, and succinylsulfathiazole was prescribed orally. A dose of 5 gr. every 4 hours was given for 2 days. During this time, the diarrhea was checked but the local symptoms required additional treatment for a week. The pup recovered without sequels.

*Case 4.*—Puppy diarrhea: This was a 2-month-old pup which had a profuse, watery, blood-tinged and odorous diarrhea. The dog had a temperature of 103 F. and was somewhat dehydrated. Force feeding was administered and salty liquids were given at frequent intervals. Succinylsulfathiazole was administered in 3.75-gr. doses 4 times a day. Within 3 days the dog was reported entirely well, with a good appetite.

*Case 5.*—Distemper of the catarrhal and bronchial type: This 7-year-old German Shepherd dog had a temperature of 105 F. The dog would not eat and showed extreme malaise. Succinylsulfathiazole was administered in 7.5-gr. doses every 4 hours, but after 3 days the temperature had fallen to only 104 F. The dose was doubled and continued for 2 days. There was no sign of toxicity such as anemia, nephritis, etc. This dog made a slow recovery, which is contrary to the writer's experience with sulfathiazole, sulfapyridine or sulfadiazine therapy. When the latter sulfa compounds are used in similar cases, recovery is prompt.

*Case 6.*—Diarrhea following weaning: A litter of five Cocker Spaniel pups 2 months old developed diarrhea following weaning. Four of these pups were placed on succinylsulfathiazole therapy with doses of 3.75 gr. every 4 hours, while the control pup was treated with bismuth subnitrate, lime water, and mineral oil. The succinylsulfathiazole treated pups recovered within 3 days, as indicated by the temperature, stools, and appetite returning to normal. The control pup continued the symptoms and had a recurrent diarrhea for a week. As the animal was becoming dehydrated, fluids were forced. Succinylsulfathiazole was administered, but the recovery was slow and the animal remained poor and undernourished in appearance.

*Case 7.*—Distemper of the catarrhal and intestinal type: A 9-month-old Cocker Spaniel had a temperature of 103.5 F. on presentation. There was a history of treatment with patent worm remedies. The animal was dehydrated, showed emaciation, and abdominal pain on palpation. The stool was black and watery, with frequent profuse amounts being passed. An injection of 0.1 normal saline with dextrose was administered and succinylsulfathiazole prescribed in 7.5-gr. doses 4 times a day. An initial dose of 15 gr. was given. Treatment was continued for 3 days. A very slow recovery was made, but the owner requested that the dog be destroyed.

*Case 8.*—Diarrhea: A 12-lb. Cocker Spaniel had a distemper-like diarrhea. The temperature was 103 F. Homologous canine distemper serum was administered and succinylsulfathiazole was given in doses of 3.75-gr. every 4 hours.

Within 3 days the symptoms subsided and the animal was discharged.

*Case 9.*—Summer diarrhea: A 9-week-old mongrel pet-shop pup was presented, with diarrhea and coryza symptoms. The temperature was 103 F. Succinylsulfathiazole was administered in 3.75-gr. doses every 4 hours for 2 days, during which time the symptoms subsided and the pup eventually recovered. The animal was vaccinated against distemper, following recovery.

*Case 10.*—Bacillary diarrhea: A 5-month-old Collie pup had a temperature of 104 F., with a distemper-like diarrhea. Bacterial count of a stool specimen showed several million colonies per cc. An initial dose of 30 gr. of succinylsulfathiazole was administered and followed by doses of 7.5 gr. 6 times a day for 3 days. The diarrhea subsided and the bacterial count dropped to a few hundred colonies per cc. No toxic symptoms were noted, and the urine, blood, and temperature findings were normal.

*Case 11.*—Diarrhea: A 6-week-old mongrel pet-shop pup was presented, with a history of diarrhea. The temperature was 102 F. and the pup was anemic and dehydrated. A diet of salted fluids was prescribed, and teaspoonful doses of lime water were administered. Succinylsulfathiazole in 2-gr. doses every 4 hours for 2 days was administered. Recovery was prompt. Two similar pups, untreated, died.

*Case 12.*—Diarrhea: A 5-week-old pet-shop pup was sick when purchased. Bismuth subnitrate which had been administered temporarily checked the diarrhea. Within a few days, the diarrhea returned, being characterized by watery blood-tinged stools. The pup was dehydrated when brought in. Succinylsulfathiazole was administered, but the pup died after the second dose. In these cases of extreme dehydration, the prognosis must be guarded, as they frequently terminate in encephalitis and death.

*Case 13.*—Diarrhea following weaning: A litter of four Cocker Spaniels about 6 weeks old had a diarrhea following weaning. Lime water was administered, and succinylsulfathiazole in 2-gr. doses 4 times a day resulted in prompt recovery.

### CASE REPORTS—FELINE

*Case 1.*—Kitten, aged 2 months, weight 2 lb., temperature 103 F., with dehydration, dysentery, coryza, etc. The kitten received 12 gr. of succinylsulfathiazole daily, divided into 4 to 6 doses, for 2 days and recovered slowly under milk and egg diet, lime water, and other supportive treatment.

*Case 2.*—Large alley cat, age 6 years, weight 7 lb., temperature 102.8 F., had a history of eating putrefied canned salmon. The diarrhea was malodorous to the extent of being nauseating. Five-grain dosages of succinylsulfathiazole 4 times a day with supporting treatment terminated the case favorably in 4 days.

*Case 3.*—A 2-year-old alley cat which had a type of feline distemper with diarrhea was treated with succinylsulfathiazole. An initial dose of 15 gr. was administered and 5 gr. 4 times a day for 2 days was given. The diarrhea subsided and the cat made an uneventful recovery.

*Case 4.*—Distemper: A 7-month-old Persian cat was presented, showing typical symptoms of feline distemper including conjunctivitis, coryza, and diarrhea. The stools of these animals generally have an obnoxious, fetid odor; such cases often terminate fatally or are destroyed. The temperature in this case was 103 F. and the animal was dehydrated and anemic, with the coat "starey" and lusterless. Succinylsulfathiazole was administered in 5-gr. doses 4 times a day for 3 days. A liquid diet was forced, and the animal made a slow but marked recovery.

### CONCLUSION

1) From a clinical standpoint, succinylsulfathiazole, as compared with other sulfonamides, is nontoxic even in large dosages and may be given to small pups with safety.

2) Succinylsulfathiazole may retard the progress of catarrhal, respiratory, and nervous forms of distemper, but is not as effective as sulfadiazine or sulfathiazole in bringing about a prompt cure of the disease.

3) Succinylsulfathiazole is useful in bacillary dysenteries and paradysenteries of the dog and cat, and it is indicated in food poisoning cases.

4) Succinylsulfathiazole is particularly effective in controlling dysenteries of pups and thereby reduces the mortality.

5) Succinylsulfathiazole is not absorbed to any extent by the blood stream. It acts bacteriostatically on the intestinal microörganisms, particularly on the coliform group and possibly on the spore forming anaërobes. Marked decreases were noted in the number of coliform intestinal organisms following the administration of medium or maximum doses. The drug appears to be effective against certain pathogens of the intestinal flora.

6) Because of the lack of absorption into the blood stream, this drug may be considered the least toxic of all the sulfonamide drugs, and may, therefore, be administered in double dosages in severe enteric cases.

The 'Sulfasuxidine' succinylsulfathiazole was furnished through the courtesy of the Medical - Research Division, Sharp and Dohme, Philadelphia, Pennsylvania.

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If housewives, innkeepers and restauranteurs were less wasteful, feeding garbage to hogs would not be so profitable.

## Quinine Substitutes

Quinine substitutes, which will be official in the new United States Pharmacopeia, have been announced ahead of schedule, together with standards for their preparation because of the urgent need of protecting our overseas forces against malaria. Due to the shortage of quinine, two synthetics, pamaquine naphtholate and quinaquine hydrochloride, may be of special value in keeping our armed forces free from that disabling periodic fever. Hearings are now held in Congress on quinaquine patents which are alleged to restrict production. Totaquine, another antimalarial drug, will also be in the official book of drugs. It contains the familiar quinine, but is mixed with other related substances also found in the cinchona barks. It is expected that this mixture can be obtained from native cinchona barks found in Mexico, Central America, and South America instead of former sources in Japanese-held territory in the Far East.—*From Science.*

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## Waterfowl banded during the fiscal years 1940 and 1941*

| Species | 1940 | 1941 | Species | 1940 | 1941 |
|---|---|---|---|---|---|
| American merganser | 12 | 118 | Canvasback: | | |
| Red-breasted merganser | 4 | 2 | Wild | 707 | 732 |
| Hooded merganser | 12 | 6 | Hand-reared | ..... | 30 |
| Mallards: | | | Greater scaup | 27 | 19 |
| Wild | 37,969 | 24,540 | Lesser scaup | 1,958 | 7,938 |
| Hand-reared | 2,077 | 2,622 | Ring-necked duck | 4,560 | 4,383 |
| Black, cross | 19 | 35 | American goldeneye | 8 | 14 |
| Black duck: | | | Barrow's goldeneye | ..... | 1 |
| Wild | 9,889 | 9,226 | Bufflehead | 6 | 24 |
| Hand-reared | 98 | 102 | Old squaw | 4 | ..... |
| Florida duck | 27 | 80 | Harlequin duck | 3 | ..... |
| Gadwall | 505 | 328 | American eider | 1 | ..... |
| Baldpate | 2,328 | 1,408 | Pacific eider | ..... | 7 |
| Green-winged teal | 4,524 | 3,999 | King eider | ..... | 1 |
| Blue-winged teal | 3,553 | 5,747 | White-winged scoter | 1 | 49 |
| Cinnamon teal | 188 | 129 | Ruddy duck | 69 | 45 |
| Shoveler | 714 | 746 | Snow goose | 12 | 92 |
| Pintail: | | | Blue goose | 92 | 166 |
| Wild | 21,419 | 15,105 | White-fronted goose | 52 | ..... |
| Hand-reared | 87 | 51 | Canada goose: | | |
| Wood duck: | | | Wild | 1,815 | 1,352 |
| Wild | 686 | 703 | Hand-reared | 116 | 41 |
| Hand-reared | ..... | 26 | Fulvous tree duck | 1 | 15 |
| Redhead: | | | Whistling swan | 1 | 7 |
| Wild | 557 | 292 | | | |
| Hand-reared | ..... | 72 | Total | 94,101 | 80,262 |

*From 1941 Annual Report of the Fish and Wildlife Service, USDI.

# Johne's Disease in Farm Animals

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JOHNE'S DISEASE is defined by Udall (1939) as, "a highly fatal, chronic, infectious disease of cattle in which recurrent diarrhea and emaciation persist for months. On postmortem examination, it presents typical thickening and corrugation of the intestinal mucosa. It is caused by an acid-fast rod which is similar in appearance to the tubercle bacillus. It has been observed in horses, sheep, deer, and goats, but it is of little importance in these animals."

In an earlier report from this laboratory (1940), a brief description of Johne's disease in swine was given. The diagnosis was based on the reactions of the animals to intradermal johnin, and on the demonstration of typical acid-fast organisms in the intestinal mucosa. A later report[1] confined itself largely to the inter-relationship between Johne's disease and parasitism in sheep.

Observations by Howarth,[2] McEwen,[3] and others indicate that death losses from clinical Johne's disease in sheep are low. M'Fadyean and Sheather (1916) have also reported Johne's disease in goats in which the manifestations were similar to those found in sheep.

Clinical cases of equine Johne's disease seem very rare. The case reported by Lieñeaux (1913) is apparently the only one recorded in the literature. The symptoms, lesions, and other observations reported by this investigator indicate that the condition observed by him was essentially the same as Johne's disease in cattle.

There is some difference of opinion as to the importance of Johne's disease as a major animal problem. Most of our information regarding this condition has been obtained from the investigators working on bovine Johne's disease. Among these are Hagan, Myer, Beach, Wisnicky, and a host of others. DeFosset[4] has recommended the complete eradication of Johne's disease in cattle by the test and slaughter method. Larson, Beach, and Wisnicky[5] enumerated many of the problems of controlling and eradicating Johne's disease in cattle herds. They pointed out the limitations of the diagnostic agents, the long incubation period, the lack of symptoms in some reactor cattle, and the problems arising from introducing untested cattle into herds.

It is the purpose of this report to summarize briefly the results of tests with intradermal johnin on different species of animals and to furnish additional information as to the distribution of Johne's disease in Arkansas, as well as to discuss some of the conditions found associated therewith.

The procedure followed in conducting the tests was identical with that employed in the intradermal tuberculin test, except that intradermal johnin furnished by the Regional Laboratory of Animal Disease Research, Auburn, Alabama, was used as the diagnostic agent.

The results of initial intradermal tests conducted since the beginning of this program are summarized in table I. These data give some information as to the distribution of Johne's disease among farm animals. In addition to the farms on which Johne's disease has been found by the use of johnin,

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it has been detected by microscopic examination of fecal smears from clinical cases in cattle and sheep, and of intestinal smears made from animals submitted for diagnosis.

Some conception of the known distribution of Johne's disease in Arkansas can be obtained from the number of counties in which the disease has been diagnosed. The 10 counties shaded in the map constitute only those counties in which investigations were conducted, and in each, Johne's disease was found. The areas in which tests were made are typical of the type of agriculture in different parts of Arkansas, so they furnish a sample of what might be anticipated in other localities of the state.

These preliminary tests show that Johne's disease is widely distributed throughout Arkansas. Horses, mules, cattle, sheep, goats, and swine have been found sensitive to johnin. In a few cases, cats and chickens were tested but were negative. Acid-fast organisms indistinguishable from *Mycobacterium paratuberculosis* have been found in the intestinal scrapings of cattle, sheep, swine, and goats, but not in two reacting mules killed for postmortem examination.

It has been possible to demonstrate acid-fast organisms in the mucosa of the intestines in about 50 per cent of reacting cattle, sheep, and swine that have been examined *postmortem*. The confirmatory examinations have indicated that the test is quite satisfactory. It is possible that the study of more areas in the intestinal tract and lymph nodes would increase the number of confirmations.

These studies have established the fact that on nearly all farms where more than one species have been tested, reactors have been found in all species. This information makes it desirable to include all of the common farm animals in a consideration of

TABLE I.—Intradermal Johnin Test Summary.

| FARM NO. | CATTLE | | SHEEP | | GOATS | | SWINE | | HORSES | | MULES | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | T | R | T | R | T | R | T | R | T | R | T | R |
| 1 | 27 | 4 | 177 | 58 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 2 | 33 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 2 | 2 | 8 | 8 |
| 3 | 21 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 4 | 19 | 2 | 5 | 1 | 0 | 0 | 21 | 0 | 1 | 1 | 6 | 6 |
| 5 | 138 | 42 | 48 | 23 | 0 | 0 | 31 | 22 | 0 | 0 | 8 | 8 |
| 6 | 24 | 7 | 110 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 7 | 23 | 10 | 0 | 0 | 0 | 0 | 3 | 1 | 2 | 2 | 3 | 3 |
| 8 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 9 | 12 | 7 | 4 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 6 | 6 |
| 10 | 122 | 83 | 20 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| 12 | 0 | 0 | 66 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | 36 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | 43 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | 0 | 0 | 19 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18 | 18 | 14 | 48 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | 4 | 4 | 73 | 21 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| 20 | 0 | 0 | 10 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | 18 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 |
| 22 | 3 | 2 | 49 | 19 | 48 | 15 | 3 | 0 | 2 | 1 | 1 | 0 |
| 23 | 26 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | 34 | 24 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 | 8 | 2 | 36 | 18 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| 26 | 2 | 0 | 20 | 8 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| 27 | 4 | 1 | 36 | 20 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 |
| 28 | 174 | 2 | 32 | 15 | 0 | 0 | 0 | 0 | 64 | 24 | 0 | 0 |
| 29 | 0 | 0 | 79 | 49 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 | 104 | 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 | 0 | 0 | 35 | 26 | 0 | 0 | 10 | 1 | 6 | 2 | 0 | 0 |
| 32 | 0 | 0 | 0 | 0 | 215 | 48 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 940 | 355 | 874 | 376 | 263 | 63 | 75 | 24 | 89 | 35 | 47 | 44 |

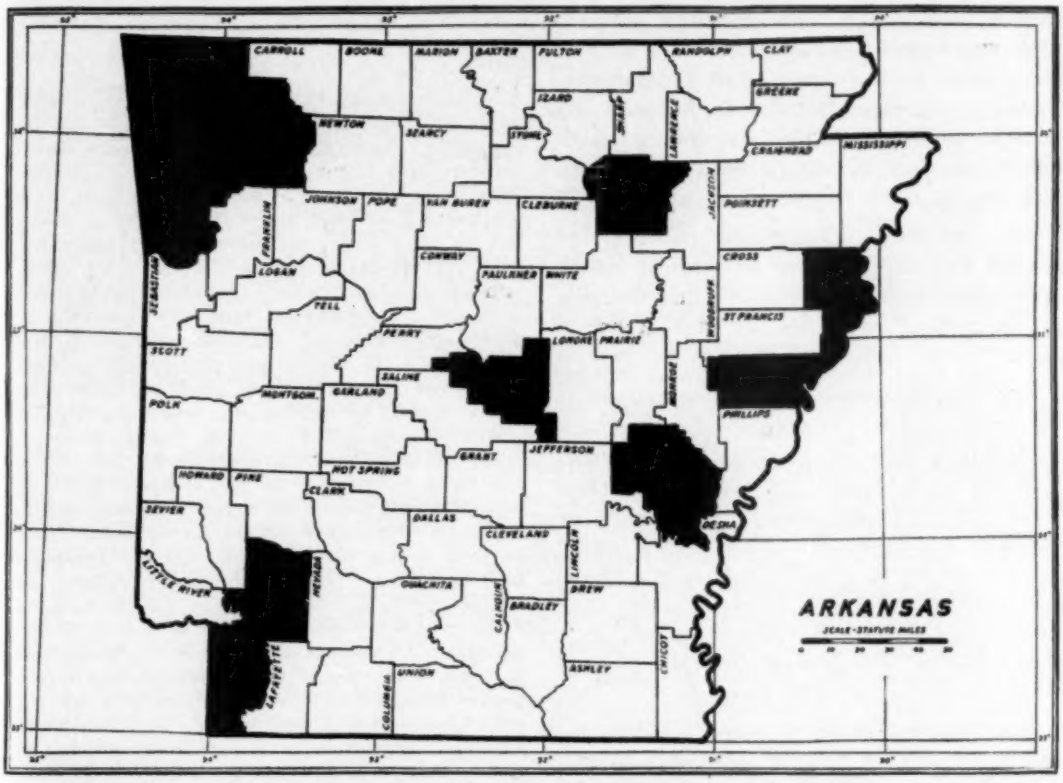


Fig. 1.—Shaded areas are counties in which Johne's disease has been found.

the Johne's disease problem, as well as in the formulation of a control program.

A program for the control of Johne's disease in cattle would be of little or no value unless consideration were given to other species of animals maintained on the same premises. These facts apply particularly to the small diversified farms where all species of livestock are kept in close association with one another.

Close association of animals contributes largely to the dissemination of this disease. Sure infection appears to be transmitted by ingestion of the organisms. The establishment of positive and negative herds has been advocated as a possible solution of the problem. There is some evidence of intrauterine transfer of Johne's disease. If this should prove common, the breeding of a herd free from reacting animals might be difficult. That isolation can prevent spread of the disease is well illustrated in the following case history:

The owner of a large plantation requested a johnin test because some of his cattle and sheep were badly emaciated, with diarrhea as a common symptom. This plantation was divided into two sections about three miles apart. On the old plantation were kept the sheep flock of 32 head, the grade cattle herd of 21 head, and 46 horses and mules. The new plantation had been recently converted to pasture and 154 head of cattle and 16 head of horses and mules were placed on it. The only livestock transferred were a few riding horses used on both plantations.

The tests on the new plantation were all negative, while on the old plantation 48 per cent of the solipeds, 9 per cent of the cattle, and 47 per cent of the sheep reacted to johnin. This planter disposed of all reacting animals and has attempted to establish Johne's disease-free herds on both places.

We have not advised the use of the test and slaughter method except in very unusual circumstances. It does not appear

that we have enough information to recommend the indiscriminate slaughter of animals reacting to johnin. Another factor to consider is the disposal to be made of reacting solipeds. If they should prove to be disseminators of this disease, irreparable damage might result from the dispersal of large numbers of reacting animals.

The presence of animals reacting to johnin, but the absence of clinical cases, particularly cattle, has caused some concern on the part of veterinarians and stockmen alike.

The investigations we have been conducting have not been in progress long enough to furnish adequate information on long-time herd histories. A coöperator has given the following history on a herd of which he disposed. We think it very useful in illustrating a point which many veterinarians believe holds good: mainly, that Johne's disease can be kept to a low incidence, if not eliminated, by the disposal of clinical cases as they develop.

The farm on which this herd was located was acquired in 1837 and cattle were maintained continuously on the premises. In the early part of this century, purebred Jerseys were introduced, and in 1910 a Jersey bull was purchased from New York. This animal died about 5 years later with symptoms of diarrhea and rapid emaciation. The veterinarian treating the case diagnosed it as Johne's disease. During the next 5 years, 8 cows died and 35 with diarrhea were shipped to market. The owner reported that every animal that started to scour was shipped. After 1920, there were no more cases of diarrhea on the place, and in 1925, there were over 100 healthy animals sold at a dispersal sale when the owner retired from business. The owner reported that during the period between 1920 and 1925 the animals were all in excellent condition. We believe that this illustration offers a good example of what can be accomplished by the removal of clinical cases.

We have been considering Johne's disease as a farm problem in which all species may be involved. In discussing the general problem, it might be easier to consider each species separately.

### SWINE

Swine reacting to johnin have always been found associated with cattle or sheep. In no instances have symptoms of diarrhea and emaciation been found. In one herd, in which both erysipelas and Johne's disease are present, there have been many runt-type pigs. They fail to grow at a normal rate and show the usual symptoms of chronic erysipelas. These animals frequently have congested hyperemic intestines, in which it has been possible to demonstrate acid-fast organisms similar to the Johnne's bacilli. Scrapings containing acid-fast organisms have failed to produce lesions in either rabbits or guinea pigs when injected intraperitoneally. The cervical lymph nodes of many of these pigs were examined, but in no case was it possible to demonstrate acid-fast organisms suggestive of avian tuberculosis. In one case, scrapings from the intestinal mucosa of a pig were injected intraperitoneally into a rabbit. This rabbit later reacted to johnin, although there were no lesions of Johne's disease or tuberculosis found at the necropsy. The results of these investigations indicate that the Johne's organism has a low pathogenicity for the pig. Although it may be coincidence, it has been possible to demonstrate acid-fast organisms in a higher percentage of swine that have died of other infections than it has been in those slaughtered for meat purposes.

### SHEEP

Johne's disease in sheep is not characterized by high death losses. Many reacting sheep in which it has been possible to demonstrate acid-fast organisms have been extremely fat. In the clinical cases of Johne's disease, diarrhea is common, emaciation is nearly always present, and the sheep have tucked-up abdomens. The characteristic intestinal lesions may or may not be present. At times, the intestinal walls are grossly thickened, but at other times they are definitely thinner than normal. Intestinal smears taken from tissue that appeared normal have been found positive for acid-fast organisms. When the intestines contain many nodules, their walls may be thicker than usual as a direct result of the tissue reaction to the helminth parasites. In Johne's disease-infected sheep, the tensile strength of the intestines seems decreased. Gentle traction on the intestines causes them to break.

Many flocks having a high incidence of Johne's disease have low lamb crops. There may be more than one factor involved in the failure of the ewes to breed, but so far we have been unable to find them in many cases.

Caseous lymphadenitis produces symptoms

not unlike those sometimes found in Johne's disease-infected sheep.

HORSES

In no instance have we observed the clinical symptoms of Johne's disease in solipeds. Two aged mules that reacted positively to johnin, and in one case negative 14 to bovine tuberculin, were killed for examination. In neither case could we find thickened intestinal walls, nor could we demonstrate acid-fast organisms in any of a large number of smears from the intestinal mucosa and mesenteric lymph nodes.

We have found colts as young as 6 months of age reacting to johnin, but we have not had an opportunity to make a postmortem examination of any of these animals.

CATTLE

Little need be said of the classical symptoms and lesions of bovine Johne's disease. As a rule, the disease manifests itelf in young cows, but there are many exceptions. The first case that we encountered was a 14-year-old cow that died following parturition. This cow was in good flesh at the time of calving, but developed diarrhea and died in less than two weeks. The lesions were advanced and the number of organisms was great.

During the past winter, we obtained positive fecal smears from several 2-year-old steers showing typical symptoms of the disease. No parasite ova were found, although the mortality was high. The owner, Goff, would not allow us to test the herd and we never learned how great the losses were. They must have exceeded 20 per cent of the animals. The Veterinarian treating this herd was asked to "vaccinate."

We have found calves as young as 6 weeks of age reacting to johnin. In all of these cases, the dam, too, has reacted. Whether these are cases of intrauterine infection or not cannot be answered at this time. We have some circumstantial evidence that Johne's disease can be transferred to the fetus during intrauterine life, and Dunkin[6] has reported one such case.

In several instances, cattle and sheep imported into Arkansas from other states have been tested upon arrival. The percentage of animals reacting to johnin has been high. This information indicates that the disease may be further disseminated by movement of animals.

The failure to demonstrate paratuberculosis organisms in all postmortem examinations of reacting animals may be considered a criticism of the johnin test. When one realizes the large amount of intestinal surface that could be invaded by the Johne's organism and still appear grossly normal, the mechanical difficulties might be appreciated more fully. A case might illustrate this: A young bull calf was isolated for an experimental infection with *Bacillus subtilis*. When he was about 8 weeks old he reacted to an intradermal johnin test. He was then given an intraperitoneal injection of a heavy suspension of *Mycobacterium paratuberculosis*. He was later tested with both johnin and bovine tuberculin and reacted to both. Shortly after this, he was killed and a minute inspection made for evidence of Johne's disease and tuberculosis. Smears were made of individual lymph nodes and composite samples, as well as from areas along the entire length of the gastrointestinal tract. No acid-fast organisms could be demonstrated and there were no lesions suggestive of either Johne's disease or tuberculosis.

There are several disease conditions which, when occurring alone or in combination, make a differential diagiosis imperative. Johnson, Milligan, and Cox[7] have demonstrated the reaction of Johne's disease infected cattle to mammalian tuberculin. This is a very important point in connection with the tuberculosis eradication campaign in cattle. It has been found in our studies that cattle frequently react to both johnin and tuberculin with no evidence of tuberculosis on postmortem examination. This is well illustrated by the last case described and offers one possible explanation of the large number of no-visible-lesion reactors now found in the tuberculosis testing work.

The reaction of horses and mules to tuberculin is less pronounced and is of lower incidence.

The number of sheep reacting to johnin has been high, but in no instance has a reaction to bovine tuberculin been observed. Fewer goats react to johnin than do sheep, and we have not observed any with a definite positive reaction to tuberculin. Many

[6]Dunkin, G. W.: A Possible Case of Congenital Johne's Disease. J. Comp. Path. Therap., xlviii (1935), p. 36.

[7]Johnson, H. W., Milligan, J. G., and Cox, B. F.: Tuberculin Reactions in Cattle Infected with Mycobacterium Paratuberculosis. J.A.V.M.A., xcix (1941), p. 115.

swine react to johnin, but we have not made any simultaneous johnin and mammalian tuberculin tests. Nearly all swine reacting to johnin also react to avian tuberculin.

It is a common feeling, among veterinarians and stockmen alike, that death losses among Johne's disease-infected cattle and sheep are usually the direct result of some other factor. We[8] have confirmed the observation of Hagan[9] that arteriosclerosis may be associated with Johne's disease in the absence of any other demonstrable cause.

In another case, evidence of vitamin-A deficiency in a cow fed adequate rations has been observed. This animal, designated Hereford 92, was dropped May 3, 1939. In May, 1940, she was considered a very good show calf prospect. At her first johnin test in September, 1940, she was a reactor. All during the winter and early spring of 1940-41, she showed diarrhea and emaciation. At times, it was considered desirable to kill this animal for humane reasons. Later, clinical improvement followed and she was bred June 24, 1941. She was pastured with a reacting bull until later in the summer. During the winter of 1941-42, the heifer was in fair condition. All of this animal's life had been spent on pasture. In this climate, there is green grass about nine months of the year. At all times, alfalfa hay and a grain supplement were available. During the winter period, silage was also fed. On May 27, 1942, Hereford 92 dropped a bull calf but abandoned him at birth. The calf was blind and had several convulsions. The second day after birth, he died. Although 92 had ample milk supply, the calf had been weak and unable to suck even when the teat was placed in his mouth. At the autopsy, it was observed that the calf had stenosis of the optic nerves very similar to that described by Moore, Huffman, and Duncan[10] in vitamin-A deficiency.

The cow was then brought to the laboratory for more complete observation and postmortem examination. She had a normal temperature and hemoglobin. She ate well, and although she did not fatten, she remained in fair condition. She was tested with intradermal johnin and tuberculin on June 15, and was negative to both. Immediately after this test, she developed a diarrhea for two days. On June 22, the fecal smears were positive for acid-fast organisms. On June 16, 25 cc. of intradermal johnin were injected intravenously, but no change in temperature followed and there were no symptoms of distress.

During the time that cow 92 was kept at the laboratory, she was frequently examined for evidence of vitamin-A deficiency. The cornea showed a persistent opacity, and there was continual lachrymation and nasal discharge. Opthalmoscopic examinations revealed lesions similar to those described by Moore[11] in the fundus. It was also noted that under ordinary circumstances the cow was gentle, but when a halter was placed on her she became very excited. The resistence to restraint has been mentioned by Schmidt[12] as a characteristic of vitamin-A deficiency in cattle.

Cow 92 was killed July 24 for postmortem examination. She appeared to be in good condition. She was killed with chloral hydrate and a blow on the head and bled out. There was not a great deal of subcutaneous fat, but the amount that was present appeared to be light colored—a chalky white. The visceral fat was, for the most part, a lemon yellow. The mouth, tongue, trachea, heart, and major blood vessels all appeared normal. The liver contained a few areas along the edge that had a burned appearance which did not extend over a millimeter below the surface. There were also several areas of about 2 mm. in diameter that were

[8]Gifford, R., Eveleth, D. F., and Gifford, W.: Arteriosclerosis in a Clinical Case of Bovine Johne's Disease. J.A.V.M.A., (In press).

[9]Hagan, W. A.: Johne's Disease, or Paratuberculosis of Cattle with a Note on the Disease in Sheep. Am. Assn. Advancement of Sci., Symposium Series, i (1936), p. 69.

[10]Moore, L. A., Huffman, C. T., and Duncan, C. W.: Blindness in Cattle Associated with a Constriction of the Optic Nerve and Probably of Nutritional Origin. J. Nutr., ix (1935), p. 533.

[11]Moore, L. A.: Some Ocular Changes and Deficiency Manifestations in Mature Cows Fed a Ration Deficient in Vitamin A. J. Dairy Sci., xiv (1941), p. 893.

[12]Hart, G. H., and Guilbert, H. R.: The Relation of Brucella abortus Infection to the Vitamin A Content of Fetal Livers. Am. J. Vet. Res., ii (1941), p. 390.

white and tough. These liver nodules were capsules containing caseated material. There was a small parasite in the liver that appeared to be a trematode. The bile was thin and of a lemon-yellow color. The gall bladder had an injected appearance. There were a few adhesions of the liver to the diaphragm. The kidneys were normal in size. One of them had the same type of subcapsular burned appearance observed in the liver. They both contained yellow, gritty, calcareous deposits in the hilus. The spleen appeared normal. The ovaries seemed to be normal and the uterus was involuted. The vagina was very white. The cervix was tightly closed and appeared normal. The uterus and urinary bladder were normal. The abomasum appeared normal. The duodenum and jejunum appeared normal, except for a few areas which were slightly rubbery to the touch. There were also a few nodules similar to those caused by the nodular worm. The ileum presented areas that were definitely thickened, although the characteristic folding of the mucosa was not observed. The ileo-cecal valve showed hyperemia with some thickening. The cecum was folded, thickened, and presented some areas in which the crests of the folds were darker than normal. The colon showed some thickening in patches. Just anterior to the anus, the rectum was extremely folded but showed no discoloration. Acid-fast organisms were demonstrated in the cecum, colon, and rectum, but all other tissues were negative.

Vitamin-A deficiency as a manifestation of Johne's disease could be the result of poor absorption, or possibly of poor utilization of carotene. In the case referred to, it does not appear possible that an inadequate intake of carotene could be the limiting factor. Cow 92 was turned on pasture continuously from June, 1940, until June, 1942. At the time she was clinically ill, she was in a small pasture and was fed a good grade of alfalfa hay in addition. Prior to her breeding, during the late spring of 1941, she was pastured on Bermuda grass. This pasture was green until late December. Even during the winter months, there was some green feed available in addition to the hay. Hart and Guilbert[10] have recently pointed out the possibility of a failure in placental transfer of vitamin A as a cause of fetal death in infectious abortions. In the course of these studies, we have investigated several abortions in cattle and sheep without being able to demonstrate the etiology beyond the fact that the animals were reactors to johnin.

The problems of abortions and the birth of weak offspring seem to be manifestations of the same conditions. In no case have we been able to incriminate either trichomonads or brucellosis.

From the results of our investigations on cattle, sheep, and swine, it appears that uterine inertia is a very common occurrence in pregnant animals infected with Johne's disease. The number of dystocias in these three species has run unusually high and, since it has been impossible to demonstrate any other cause, the paratuberculosis organism is suspected. The dams may show no evidence of labor. The young in these cases usually appear normal in development but they are very weak. They must be assisted at time of birth, or they remain in the birth canal a long time. In cattle and sheep, the vagina frequently prolapses following parturition.

Cattle and sheep in a badly debilitated condition frequently fail to react to intradermal injections of johnin. In a few cases, we have tested them by injecting the same material intravenously. These animals usually respond by a decrease in body temperature, prostration, dyspnea, and in some cases foam accumulates in the respiratory passages. Similar injections in animals with no symptoms of Johne's disease show no reactions whatever, or a slight increase in body temperature. For these injections, we have used 5 cc. for a sheep and 25 cc. for a cow. The case of cow 92 is typical of several in which acid-fast organisms have been demonstrated in cattle and sheep which did not react to either intradermally or intravenously injected johnin.

The nonreacting animal which develops a clinical case of Johne's disease with fatal termination is one of the difficult problems

sometimes encountered. We have no satisfactory explanations to offer. It may have a rapidly developing type of the disease, or, in some cases, the debilitated animal may lose its sensitivity to johnin. The results of repeated tests by other investigators, as well as ourselves, have shown that animals may or may not give repeated positive tests to intradermal johnin. We cannot say "Once a reactor, always a reactor," because experimental evidence does not bear this out.

SUMMARY

1) Swine, sheep, goats, horses, mules, and cattle have all been found sensitive to the intradermal johnin test.

2) Clinical cases of Johne's disease have been observed in cattle and sheep but not in the other species.

3) It is probable that Johne's disease may act as a predisposing factor in the production of other disease conditions in cattle and sheep.

# The Relationship of Diet to the Development of Haemonchosis in Sheep

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THE FLOCK that forms the subject of this report was first seen by the writers in the latter part of May, 1941. It consisted of 200 aged, western grade ewes, about 250 spring lambs, and 4 or 5 rams. The sole diet of the adult sheep was a good native grass pasture of about 180 acres. The pasture had one serious fault, however. It was bowl shaped, and all drainage was toward an area shaded by a number of trees. Water accumulated in this spot, and its attractiveness to the sheep made them do most of their grazing in this area.

Preliminary examinations of the flock by a modified Stoll-McMaster's technic (Whitlock, 1941) revealed that the ewes were heavily infected, but that the lambs were not infected. As a part of a test of various copper anthelmintics the flock was treated on two visits during the month of June. From time to time various lambs were treated for worm infection, but they were consistently negative. As is usual with copper anthelmintics, some of the ewes were treated ineffectively on the basis of the fecal egg count. Since none of the ewes had shown marked symptoms of haemonchosis in May or June, no retreatment was attempted, although the farmer was warned to retreat in a month or two or at the first sign of trouble. In addition, it was recommended that he fence off the low spot in the pasture to prevent the lambs from becoming infected.

On August 11, we returned to the farm to find both ewes and lambs sick of acute haemonchosis. Our advice had been ignored, although the farmer was getting ready to treat the flock at the time of our visit. One newly dead ewe was available for autopsy and showed typical lesions complicated by a localized purulent pneumonia. By arrangement with the farmer, the 30 worst ewes were not treated but instead were sent to the Agricultural Experiment Station. One moribund lamb was sent with the ewes. Postmortem examination of it revealed typical lesions of haemonchosis.

The 30 ewes arrived at the Experiment Station August 13 and were immediately watered and given one bale of alfalfa hay. On August 14, they were fed two bales and on the fifteenth three. As the hay was

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"stemmy" a large amount of it was not all eaten. Nevertheless, each animal fed heavily. Beginning with August 14, increasing amounts of yellow corn were fed the animals until the flock was receiving a three-gallon bucketful. No more was given because the sheep were so old they could not handle it successfully.

On August 17, fecal samples were obtained from the flock and, as shown in table I, most of the animals were heavily infected. The improved diet almost at once improved the physical condition and spirits of the flock. By August 25, several animals were again showing symptoms of acute haemonchosis; therefore, the animals were divided into three groups on the basis of the egg count of August 17, and two of the groups were treated with copper sulphate. Just before treatment a fecal sample was taken from each sheep. The counts obtained from these samples and summarized in table I present the most important aspect of this case. These data show that out of the 30 sheep, 11 cured themselves and almost all had cut down their worm burden appreciably. While some of the lessening of the dilution egg count was undoubtedly due to the increased ration, and possibly to egg-count variation, it is impossible to ascribe all the improvement to this source. Therefore, an appreciable number of worms must have been eliminated from the sheep.

This case offers clinical confirmation of the experiments reported by Gray, 1916; Warwick and Bell, 1930; Ross and Graham, 1932; Fraser and Robertson, 1933; and others, which suggest that haemonchosis in sheep is fundamentally a nutritional disturbance. The pasture in early summer prevented the appearance of marked symptoms of the disease and deaths; the later alfalfa-corn regimen markedly reduced the worm burden of the group. Something was present in these two diets which was not present in the diet on the late summer pasture.

Vitamin A, to a certain extent, meets these requirements. Hot suns often bake Kansas pastures brown by the end of July, hence reducing their carotene content. In addition, Vitamin A has been shown to be an important factor in the resistance of adult animals to other parasitisms. The animals were anemic even when comparatively free from worms, since several animals with a marked conjunctival palor were shown, by the dilution egg count, to have low worm burdens. This fact, in conjunction with the shortness of breath, nasal discharge, and lung lesions found in this group is suggestive of the lesions and symptoms of A-avitaminosis as reported by Schmidt (1941).

However, Baker (1941) has had spectacular results treating calves for trichostrongylosis with yeast, and ancylostomiasis, the pathogenesis of which is similar to haemonchosis, seems to be fundamentally an iron deficiency; so the exact type of deficiency responsible for the development of haemonchosis cannot at present be given.

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The Philippines, Burma, Indo-China, Dutch East Indies, Borneo, India, the Near East, and North Africa are not as far from your doorstep as some folks once supposed.

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The dog is the only animal, which of his own accord and without special training, force, or harness seeks to live by the side of man.—*E. J. Gaspari in the Kennel Gazette.*

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Do veterinarians realize that they are a part of the public service, not merely men of business without responsibility to the state? The state maintains their college and the state issues them a license to practice. The veterinarian is dependent, not independent. He is subject to the will of the people, but is free to help shape that will.

**Truthful dispatches from unbiased sources annunciating an appalling food situation in Continental Europe can be translated into edicts on the duties of the veterinary service.**

# Publication Rules of the AVMA

L. A. MERILLAT

*Critics will please note that every detail of the rules contained in this series of articles has not been obeyed in past issues, not even in this one. The series is written for future attention and guidance.*

## *Punctuation*

*The Use of the Comma.*—There are many books, obtainable for "a dime a dozen", purporting to teach the proper use of the comma but each one stands rebuked by the other. The present tendency, says Webster, is to avoid using the comma, except to *prevent confusion*, and this represents the orthodox rule set down as a guide to the proper use of this punctuation. Where the rule is faulty is in failing to establish the borderline between *confusion* and *clearness*. So, whether abolishing the use of the comma as much as possible is correct usage may be questionable, particularly where manuscripts pass through several hands each with his/her own idea as to where clearness ends and confusion begins.

The AVMA, as readers may have noted, leans toward free "commaization" (to coin a much needed word) for the reason that setting off, uniformly, all introductory words and parenthetical phrases (grammatically speaking) improves the elegance of scientific text material, indicates that the manuscript has been carefully edited, and avoids the confusion which arbitrary omission of the comma creates. The comma also facilitates reading by separating component parts of sentences which, in its absence, makes the reader hesitate and go back to read again in order to get a precise understanding of what the writer is trying to say. The excuse for abolishing the use of the comma on the ground that newspapers and certain magazines do is not valid for the writer of technical literature, where error or lack of clearness has more significance than news of street fights or highway robberies. To paraphrase: In technical literature "What's writ is writ" for all time to come.

This is being written with a journal of science and a magazine of upper frame at the elbow, and here is what's in sight:

To this end, he cooked a special dish...
Apparently the cat had read the Boy's Manual...
Finally, we eliminated unnecessary overhead...
Finally it was clear that we had not been seen...
In 1865 the country was impoverished...
In 1942, a great war is raging and...
Actually, the history of this war...
Actually there are three gents behind the blitz...
In 1914 the Battle of the Marne...
In 1917, the risk had been taken...

Note in this group of sentences, selected at random from publications of the higher type, that there is no regularity, whatsoever, in the use of the comma to set off the introductory word or expression; and, if you please, try to explain in what respect the use or omission of the comma governs *confusion or clearness* in these examples. "Sloppy work" is how a practical editor dubbed these displays of ambiguity. For our purpose there is, therefore, no alternative than to make no exception in the use of the comma after introductory and parenthetical terms, *e.g.*:

In 1942, the meeting was held in Chicago.
For instance, the serum was misused...
In that case, a purgative is indicated.
Finally, the animal recovered.
Occasionally, one is justified...
Physically, the United Nations are strong.
Morally, there is room for improvement.
Of course, the prognosis was not favorable.
Satisfied, the animals left the trough.
Thus, the tide was turned against Hitler.
Microscopically, the presence of inclusion bodies was disclosed.

There is no valid excuse for omitting the comma after these adverbial, prepositional, and participial introductions to

sentences. Strangely, they are seldom omitted after *moreover, therefore, furthermore,* and the other adverbs of that type are quite generally punctuated—a sheer case of habit not infectious enough to include other words of precisely the same kind and used in exactly the same way.

There are, however, many uses of commas in sentence construction which grammarians attempt to classify for guidance. Among these, in addition to the introductory terms cited above, are:

*a*) To separate words in series, usually nouns, but regardless of their part of speech, *e.g.*:

The chairman, secretary, delegates, and visitors were taken into custody.
The disease affects, horses, dogs, cattle, and sheep.
Antiseptic, deodorant, and germicide agents.
These dogs are feral, ferocious, and famished.

Although, it is the custom of some publications to omit the comma before the *and* between the last two words, the only excuse for doing so is convenience. Whereas, the last two words are independent, the conjunction is incorrect. The omission leaves no opportunity to couple such words into a unit when so desired. In the four examples cited above, it is plain that the comma before *and* conveys a different meaning than were it omitted. Coupling *delegates* and *visitors* leaves the impression that there were others taken into custody, though the writer desires to report that everyone present was arrested. Connecting *cattle* and *sheep* might imply that the polygastric animals were distinguished from the other two. In the third example, the *and* shows clearly three independent effects of the *agents,* and in the fourth example, *ferocious* and *famished* have unrelated causes. In the course of veterinary-medical writing, much better examples than these could, perhaps, be found. In short, the last two words of such series are not units and, therefore, should be set off with a comma.

*b*) Negative expressions used to emphasize by contrast are separated from the fact stated, *e.g.*:

He succeeds, not by bluffing his way up.
The disease affects, not only the heart, but also the kidneys.
They believe in the Bible, not merely in God.

The negative form of expression set off with a comma, is a powerful type of emphasis. It implies that no more could be said.

*c*) Relative clauses are set off with commas only when remotely separated from the rest of the sentence, *e.g.*:

President Roosevelt, who was elected for the third time, declared war against Germany.
Sulfanilamide, the most popular drug of this period, has a strong bacteriostatic action.

Short relative clauses in close apposition to the antecedent, need not be separated. The relative pronoun *that* takes its place, *e.g.*:

It is the best cigarette that I ever smoked.
This is the strictest law that was ever passed.

*d*) In the course of medical writing, the use of college degrees is often required. Whether the abbreviations of college degrees follow one another or lead directly to text material, a comma follows the period, *e.g.*:

James Henry Felton, B.S., Ph.D., M.D., Chicago, Illinois.
James Felton, M.D., spoke at the meeting.
James Felton, Ph.D., is a teacher of nutrition.

Although the comma after the degree in the last two examples may seem superfluous, its omission displeases the eye.

Finally, may we suggest to authors that manuscripts be scanned carefully for places where a comma will improve clarity and facilitate reading. Contrary to the too general impression that this punctuation is a thing to abhor and avoid, better to learn the art of its proper use and especially its uniform use under identical circumstances. What gestures, inflection, pounding the table, and applause by the audience do for the speaker, the little comma (like italics) can do, to a considerable extent, for the writer.

# *Enumeration*

Since numbers are used to express time, distance, measure and value, they naturally abound in veterinary literature to such a degree that a style for using them seems *à propos*. Were no rules on the use of numbers obeyed, there would be many variations within articles and, therefore, a maze of hotchpotch within the finished periodical.

Numbers can be expressed by digits* or words, but, generally speaking, many are prone to ignore regularity in the use of one or the other, or else follow certain popular teachings of which there are many. One stylist spells out all numbers of less than three digits, while another, and properly so, makes numerous exceptions to the rules of thumb which the others propose, such, for example, as words in lieu of figures for one-digit numbers, two-digit ordinals, periods of time, indefinite numerals, *et al.* Popular usage governing ordinary reading matter, in so far as numbers are concerned, is not entirely suitable for veterinary literature. There are many reasons why the American Medical Association deemed it wise to build up a style of its own years ago for the guidance of medical writers. Likewise, there are reasons, peculiar to veterinary medicine, why the American Veterinary Medical Association faces the identical obligation to the veterinary profession.

Admitted, there is no great sin in writing 1, 2, 3 . . . four, five six . . . up to nine, or any assortment of the 10 digits to make up figures of any size. But, common sense has to step in to improve clearness, elegance, brevity, and suitability for one's purpose. For instance, the author of a popular story would write:

> Farmer Jahnsen has eight horses, twenty-two cows, ninety-nine sheep, four goats, seventy-seven turkeys, and sixty-three hogs.

On the logical ground that this sentence is a sort of tabulation, of which there are many in veterinary writing, the AVMA would write:

> Farmer Jahnsen has 8 horses, 22 cows, 99 sheep, 4 goats, 77 turkeys, and 63 hogs,

and thus save a line of type without sacrificing anything worth while. And, why write "forty-seven cubic millimeters" instead of "47 cmm[3]" to save a few ems. On the other hand, because lengths of time are commonly spelled out, we would bow to custom by writing:

> Farmer Jahnsen spent *twenty* years building up his stock and for *seven* years he was hampered with brucellosis.

Here are three examples containing considerable guidance on the use of digits and spelled out numbers. But, all is not that simple. It is not claimed that even that much of our creed is always religiously obeyed in our own publications. For our purpose, it has been thought convenient and, we believe, proper, to spell out numbers under and including *nine* and to use digits for numbers above and including *ten*, *e.g.*:

> There were *nine* shoats in the lot.
> The stable contains 16 cows.
> Covers were set for 150 guests.

When a sentence contains one or more one-digit numbers followed by one or more two-digit numbers or over, all of the numbers are expressed by digits thus:

> There were flocks of 6, 8, 12, and 16 on the farm. Of the 42 ewes, there were 8 weak ones, receiving 12 drams 4 times a day.

Another exception to the rule of spelling out all numbers under 10 is made also in enumerating equipment and material to be used for an operation, autopsy, or experiment.

> Assemble 2 pans, containing 3 quarts of 10 per cent lysol solution, 3 scalpels, 1 pair of scissors, 4 hemostats, 4 curved needles, 2 pairs of rubber gloves, gauze, cotton and bandage.

Good judgment must, however, be invoked to avoid misuse of this privilege in the use of digits, and on our part personal preferences of authors are not frowned upon. Hard and fast rules in these res-

*Arabic, occasionally roman.

pects are admittedly hard to formulate for the borderline cases.

*Age of living things* is expressed in digits, excepting of course, when the number is the first word of a sentence. Otherwise, no exception is ever made in denoting age, *e.g.*:

The pup was 1 month old.
It was a 3-year-old bull.
He was a man of 80.
The colt was 10 weeks of age.

This rule is intended to be followed religiously in AVMA publications. It is also the style of the AMA.

*Prescriptions and formulas.*—Here, numbers are expressed in digits, always. For apothecary and avoirdupois weights and measures, lower case roman figures are used and they are placed after the unit of measure:—

Atropine sulfate .....gr. iij
Zinc sulfate .....gr. xij
Rose water .....oz. j

For running reading matter, the amount is placed before the unit of measure:

An excellent collyrium for pink eye consists of atropine sulfate, 3 gr.; zinc sulfate, 12 gr.; and rose water, 1 oz., dropped into the eye in 30-minim doses 3 or 4 times a day.

In the metric system, arabic digits are used and they are placed before the unit of measure:

Strychnine sulfate ..... 0.06 Gm.
Distilled water .....30.00 cc.

*Lengths (periods) of time*, at least from hours to eons, under 100 are always spelled out, except in tables, lists and catalogues, where space forbids:

The herd was examined at *one*-day intervals.
The pain lasted *forty* minutes.
They arrived *fifteen* minutes later.
We used a *sixteen*-hour culture.
That was *twenty-four* years ago.
It died after *three* weeks of treatment.
The treatment lasted *twelve* hours.
That was *thirty* centuries before Columbus.
All recovered in *140* days.

*Indefinite numbers* are spelled out with but few exceptions, in such examples as:

The Bureau was founded in the *eighties*.
The mortality per *hundred* ran high.
He received more than *fifty* doses.
We dosed over *seventy-five* sheep.
There were over *twenty* outbreaks.
The army has over *four* million men.

Were the numbers in the foregoing examples definite terms, they would read:—

The Bureau was founded in 1884.
The mortality was 42 per 100.
He received 53 doses.
We dosed 75 sheep.
There were 24 outbreaks.
The army has 4,250,000 men.

*Ordinals* below 100 should be spelled out, and those of three or more figures expressed in digits:

He hiked to the *nineteenth* hole.
That was the *fifteenth* death in the herd.
The *sixth* potency is powerful.
This is the *seventy-sixth* day.
Death occurred on the 250th day.

When it becomes necessary to use an unusual number of ordinals in an article (or paragraph), authors will do well to reconstruct the material by making up a tabulation and thus avoid peppering manuscript with ugly ordinals of two or more digits:

*Time, dates, sums of money, street numbers* are expressed in digits: 4 p.m.; 9:15 a.m.; January 4; Dec. 25, 1942; $4.50; $152; 600 S. Michigan avenue. The incorrect form would be:

The time is four P.M.
The date was January 4th.
The charge was four dollars.

*Decimals* are expressed in digits, with the decimal point prominently shown. In the absence of another digit, the cipher (0) precedes the decimal point, thus: 0.15 rather than .15. The cipher before the decimal point prevents typographical errors which, in technical material, may be serious.

*Recapitulation.*—The following groups summarize the use of digits and spelled out numbers in AVMA publications:
*Spell out*:

1) Numbers below 10
2) Ordinals from 1 to 100
3) Lengths of time

4) Indefinite numerals
5) Common fractions up to one hundredth

*Do not spell out*:

1) Numbers from 10 up, except as shown above
2) Weights and measures
3) Degrees of heat (fever, *et al.*)
4) Ordinals above 100
5) Decimal fractions
6) Page, reference, serial, figure, and table numbers
7) Number of cases, patients, animals, etc.

In writing numbers of four or more digits, a comma is placed after the unit figure and after each three succeeding digits: 1,123; 15,360; 125,000; 3,500,000; but the comma is omitted in page numbers (folios), reference numbers, serial numbers and case, experiment, or project numbers: page 1040, 1492 A.D., cow 1022, project 1046, etc.

In trying to avoid the hit or miss use of numbers, a good start can be made by giving a few moments to the preceding paragraph on *Recapitulation*. While the arbitrary directive of using digits for numbers above *nine*, to the exclusion of others which set the figure at 100, is subject to criticism, it seems to be the plan best suited for the kind of material submitted for publication by veterinarians and related groups. In this respect, as in other installments of this series, the author stands receptive to more critical analyses.

There is no disgrace in writing below high standards. Whole centuries produce but few good writers. But, it is quite delinquent not to try to write better, and that is the object of this series of articles on veterinary medical writing.

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In 1913, the addition of a microscope to the equipment of a veterinary hospital in Illinois made the headlines of a veterinary journal. The owner was F. R. Whipple of Peoria, who wrote: "A microscope is a necessary instrument in canine and feline practice."

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Not only do our farmers feed the nation and the embattled democracies but they even supply some politicians with food for thought.—*Pathfinder.*

## Army Buys 270 Million Doses of Atabrine

"Enter Atabrine, Exit Malaria," is the title of an article by Paul de Kruif. Atabrine, substitute for quinine which is not now available in sufficient quantity to meet the needs of the military and naval forces, owing to loss of the main quinine-producing countries to the Japanese, is being produced in the United States in large quantities by the Winthrop Chemical Company and Merck & Company. These chemical houses have stepped up the annual Atabrine production from 5 million to 500 million doses, Dr. de Kruif declares, and, moreover, this new antimalarial drug is rated as "a vast improvement over quinine."

The need of antimalarial treatment for soldiers in the field is so great in the present conflict that even the world's entire output of quinine would not be sufficient.

The making of Atabrine is a German secret. The formula was sold to American chemists with certain essential details withheld. But the puzzle was nevertheless solved by Sherndal of the Winthrop company.

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## Milk; The Master Food

Milk protein is complete, milk sugar has more nutritive value than other sugars, butterfat is superior to other fats in promoting growth, milk contains vitamin A, thiamin, niacin, riboflavin in considerable quantity and supplements food lacking these factors, calcium and phosphorus are dependable ingredients, and, when added to milk, vitamin D is more effective than in other foods.—*From the Dairy World.*

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## Physician's Opinion of a Vaccine

Since the disease may appear in dairy herds between blood tests, serological tests give poor protection to the consumer of raw milk, and no vaccination of cows offers any protection against undulant fever, which is an important disease in Kansas. Pasteurization is the sole safeguard against milk-borne diseases.—*Journal of the Kansas Medical Society.*

SURGERY & OBSTETRICS
AND PROBLEMS OF BREEDING

# Aseptic Technique in Veterinary Surgery

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ASEPTIC TECHNIQUE may be symbolized as a pillar of modern successful surgery. The procedures and methods that determine asepsis in surgery are so frequently abused and compromised that they are in urgent need of objective clarification and emphasis. Nearly every practitioner has his own individual practices to achieve asepsis. In many instances, the basis of these procedures is a mixture of fact and fancy and the applications accordingly faulty. Aseptic technique should not be attempted as a half-hearted measure, but should be employed in the most rigid manner. If successful surgery is practical, then so is the utilization of aseptic technique according to the most exacting scientific standards. In the interest of emphasizing the fundamentals of modern aseptic technique and the standardization of their application in veterinary surgery, this discussion will be undertaken.

## CHEMICAL DISINFECTION

Since chemical disinfection is extensively employed, it is important that the particular disinfectant be considered for its merits, and that the general and individual limitations of this group of agents be recognized. The action of these chemicals is either selective, or erratic and unreliable, unless used carefully. Dirt, grease, or soap, as well as blood and pus, decrease their effectiveness. The application of these products with friction enhances their action. The most frequent error in the use of chemical disinfectants is the inadequate time permitted for bacteriostatic or bactericidal effect. Good disinfectants require 30 minutes to destroy vegetative organisms and 18 hours to kill spores. Wherever possible, heat is preferable to chemicals as a means of sterilization.

1) *Ethyl alcohol* is used extensively and is widely accepted as a skin disinfectant. Most practitioners have come to accept a 70 per cent volumetric solution as the most effective concentration, particularly since this is the usual commercially available preparation. However, recent investigations by Dr. Phillip Price,[1] of Johns Hopkins University, have conclusively demonstrated that ethyl alcohol exerts its maximum bactericidal efficiency at a very exact concentration of 70 per cent by weight. This latter solution is equivalent to a 78 to 80 per cent volumetric concentration. The importance of using an exact concentration is emphasized by the fact that a 70 per cent by weight solution is 30 times as powerful as a 60 per cent by weight solution or 40 times as effective as an 80 per cent by weight preparation. One minute of rubbing the skin with this 70 per cent by weight alcohol is equal to 6.5 minutes of scrubbing with soap and water. A simple formula for this preparation is:

Ethyl alcohol (95% at 25 C.).. 815 cc.
Cold distilled water *q.s. ad*.....1000 cc.

This solution may be satisfactorily denatured by the addition of 2 cc. oil of

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M. S. Arlein, from Angell Memorial Animal Hospital, Boston, Mass. (now on active duty as Captain, V.C., U. S. Army), and C. W. Walter, Director, Laboratory for Surgical Research, Harvard Medical School, Boston, Mass.

[1]Price, P. B.: Ethyl Alcohol as a Germicide. Arch. Surg., xxxviii (March 1939), pp. 528-542.

cajuput to each quart. A distinctive tint can be effected by adding 2 drops of 1 per cent aqueous eosin to each gallon.

2) *Ethyl-propyl-alcohol* has an even higher bactericidal action than ethyl alcohol and is prepared by mixing:

| | |
|---|---|
| Ethyl alcohol (95%) | 675 cc. |
| N propyl alcohol (C.P.) | 250 cc. |
| Distilled water | 250 cc. |

All constituents should be mixed at a temperature of 25 C. One minute of rubbing with this alcoholic solution is equivalent to 11 minutes of scrubbing.

3) *Chlorine compounds* are extensively used on skin and tissue. Their disinfectant action is good when they are used carefully. Many chlorine compounds are characterized by their instability and inactivation in combination with organic matter.

*a*) Lime paste is one of the more popularly used chlorine preparations; its formula is:

| | |
|---|---|
| Chlorinated lime (30% $Cl_2$) | 200 Gm. |
| Sodium bicarbonate | 200 Gm. |
| Sodium carbonate (C.P.) | 80 Gm. |

Since this mixture rapidly loses its chlorine content in combination with water, it is best to store the preparation as a powder until needed. In order to use lime paste, the powder should be mixed in the hands with sufficient water to make a thin paste. Four minutes of rubbing with this compound is worth 20 minutes of scrubbing.

*b*) Dakin's solution is an official preparation containing 0.5 per cent sodium hypochlorite and its use is well established. This compound is unstable, should be freshly prepared, and never heated. It is very effective for irrigating wounds and cavities, particularly since it dissolves necrotic tissue.

*c*) Azochloramid is a stable commercial chlorine compound that is good for irrigating septic wounds, although it does not dissolve necrotic tissue. Its action can be greatly enhanced by the addition of tetradecyl sulfate, which aids penetration.

*d*) Iodine, in the form of aqueous solutions, has been extensively investigated[2] as a skin and tissue disinfectant. The formula for the U. S. P. solution of iodine is:

| | |
|---|---|
| Iodine | 20 Gm. |
| Sodium iodide | 24 Gm. |
| Water *q.s.* | 1000 cc. |

The recommended concentrations for use are 1 : 20 for deep tissues and 1 : 4 concentrations for wet dressings. Its germicidal action is good and for general surgery is preferable to tincture of iodine. If necessary, aqueous iodine solution can be decolorized with sodium thiosulfate.

*e*) Formaldehyde is one of the few germicides that is suitable for the disinfection of instruments. Both the aqueous and alcoholic solutions are reliable.[3] This classification of chemical disinfectants includes the well-known Bard Parker's germicide and three other preparations which can be easily and economically prepared:

I

| | |
|---|---|
| Sodium tetraborate | 50 Gm. |
| Formalin (10%) *q.s.* | 1000 cc. |

II

| | |
|---|---|
| Formalin (38%) | 130 cc. |
| Potassium nitrite | 0.15 Gm. |
| Sodium hydroxide | 0.012 Gm. |
| Ethyl alcohol (95%) *q.s.* | 1000 cc. |

III

| | |
|---|---|
| Formalin (38%) | 135 cc. |
| Sodium hydroxide | 10 Gm. |
| Distilled water *q.s. ad* | 1000 cc. |

Rubber goods are satisfactorily disinfected in the latter solution by permitting a 2-hour exposure.

All of these germicidal solutions require a minimum of 30 minutes to kill vegetative forms and 18 hours to destroy spores.

*f*) Quartenary Ammonium Salts.—In recent years, a highly efficient group of general antiseptics have been elaborated from benzyl ammonium chloride. These preparations are known commercially as Zephiran*[4] and Phemerol.** They have a low toxicity, are soothing to the skin, and have excellent detergent properties. However, they lose their activity in combination with soap and

[2]Nye, R. N.: The Relative in Vitro Activity of Certain Antiseptics in Aqueous Solution. J.A.M.A., cviii (Jan. 1937), pp. 280-287

[3]Spaulding, E. H.: Studies on the Chemical Sterilization of Surgical Instruments. Surg., Gynec., & Obstet., lxix (Dec. 1939), pp. 738-744.

[4]Walter, C. W.: The Use of a Mixture of Cocoanut Oil Derivatives as a Bactericide in the Operating Room. Surg., Gynec., & Obstet., lxvii (Nov. 1938), pp. 683-688.

may cause a dermatitis. Combination with organic matter also reduces their efficiency. The recommended concentrations for use are:

Glove basins .....1 : 5000
Dishwashing .....1 : 5000
Washing furniture .....1 : 2500
Skin .....1 : 1000
Instruments—1 : 1000 plus 0.5% sodium nitrite

Thirty minutes are required for the destruction of vegetative organisms, whereas 18 hours are needed for the destruction of spores.

An industrial preparation called Roccal,‡ also containing benzyl-trialkonium chloride, may be used on furniture, floors, and dishes. This is an economical source for this type of use.

*g*) Germicides unsuitable for surgical use.—A number of official (U.S.P.) and commercial disinfectants that are unsuitable for use in surgery have been studied.[5] Such mercurials as bichloride of mercury have been found to be bacteriostatic or antiseptic, but not germicidal. In addition to its limitation of action, it corrodes metal instruments, loses power in the presence of organic matter, coagulates protein, causes dermatitis, and is a poison.

A large group of commercial mercurial germicidal preparations were investigated, and none was found to be dependable for the sterilization of instruments. This group also included the popular biniodide tablets.

*h*) Phenol and cresol solutions act slowly and do not destroy spores, but damage tissue even in low dilutions. In human medicine, they are not recommended for wet dressings since they may produce gangrene.

As a matter of economy and good organization, select *one* good chemical skin disinfectant. Do not load up your shelves with every form of disinfectant. Many poor disinfectants are expensive. Facts and not the commercial sales propaganda of the salesman should govern your choice.

### Disinfection of Skin

The bacterial flora of the skin[6] is composed of (1) transients, which are accumulated from surface soil and elsewhere (these organisms can become residents at any time), and (2) residents, which include the stable saprophitic population of normal skin.

Organisms in both groups increase by multiplication. The bacterial flora may be decreased by friction great enough to rub them off, or by rubbing in germicides such as 70 per cent alcohol or lime paste.

These facts may be applied to the disinfection of skin by (1) avoiding contamination with obviously infected material, (2) trimming nails short, and (3) using mechanical cleansing conscientiously.

Gross dirt is removed by a 1-minute scrub. Transient bacteria and desquamated epithelium are removed by 2 to 3 minutes of scrubbing, and free fats by 6 to 8 minutes of scrubbing. A stiff lather formation emulsifies fats, waxes, and oils, as well as eases the discomfort of scrubbing.

Germicides can destroy residual resident bacteria, but they must be given time to act. A 0.5 per cent dispersion of cocoanut oil soap kills vegetative bacteria in 2.5 minutes. In regard to the various type soaps, all are germicidal by reason of their detergent action, but cocoanut oil soap is one of the few soaps that actually exerts a bactericidal effect due to its individual chemical nature.[7] Tincture of green soap is rapidly falling into disuse, and it is not recommended. Tincture of Zephiran 1 : 1,000 destroys hand bacteria with 2 minutes of rubbing. The scrubbing equivalents of rubbing with lime paste and 70 per cent

[5]Brewer, J. H.: The Antibacterial Effects of the Organic Mercurial Compounds. J.A.M.A., cxii (May 1939), pp. 2009-2018.

*Zephiran (Winthrop) = benzyl-trialkonium chloride. **Phemerol (P. D. & Co.) = para-tertiary-octyl - phenyl - diethoxy- dimethyl-benzyl-ammonium chloride monohydrate. ‡Roccal (Winthrop), = benzyl-trialkonium chloride.

[6]Price, P. B.: New Studies in Surgical Bacteriology and Surgical Technic. J.A.M.A., cxi (Nov. 1938), pp. 1993-1996

[7]Walker, J. E.: The Germicidal Properties of Soap. J. Infect. Dis., xxxvii (1925), pp. 181-192, and xxxviii (1926), pp. 127-130.

ethyl-propyl alcohol have already been mentioned.

### DISINFECTION OF HANDS

A standard routine for the preoperative disinfection of the hands is advocated. First, the hands should be given a thorough anatomic scrub, covering all portions of the skin. An anatomic scrub means that all portions of the hands should be washed in a systematic manner of progression and repetition. Skin bacteria may be likened to a layer of lamp black and oil that covers the hand as a black glove, and unless care and energetic scrubbing are employed, portions of the hand will be left contaminated. A blend of cocoanut oil soap is the best type to use, and a stiff lather should be constantly maintained. The length of time required for scrubbing will be regulated by the speed and care of employing this procedure. Every surface should be scrubbed at least 30 times with the brush. After scrubbing, the hands should be thoroughly rinsed in running water. Careful rinsing will prevent a dermatitis and protect the germicide to be used subsequently. The finger nails may be cleansed prior to scrubbing or during the procedure. Following the rinse, dry the hands on a sterile towel and then rub the hands and forearms with 70 per cent by weight alcohol, or with stainless tincture of Zephiran (1:1000). We use the latter solution. Lime paste may be used in place of these alcoholic solutions.

Mercuric biniodide, mercuric chloride, cresols, and ether are not recommended for disinfection of the hands.

### DRY GLOVE VS. WET GLOVE TECHNIQUE

Since the skin of the hands cannot be rendered sterile, sterile rubber gloves are used. There is an important controversy on the use of the dry glove technique, as compared with wet gloves. The former method is well known to all practitioners and needs no elaboration. Wet glove technique will be briefly described and the two methods compared. The gloves to be used are slightly powdered, wrapped in a muslin folder, and sterilized with steam in a manner similar to the glove preparation for the dry glove method. Prior to the actual operation, these sterile gloves are aseptically removed from their wrapping and placed in a sterile basin containing a suitable germicidal solution. It has been our practice to use aqueous Zephiran 1 : 5000 in the glove basins. After the operator has prepared his hands in the manner described, he fills a glove with the germicidal solution in the basin and forces his hands into the filled glove. The gloved hand is then raised and the wrist portion of the glove is stretched to permit the excess germicide to flow back into the basin. During the operation, the operator may rinse his hands in the germicide as often as he desires.

A greater amount of powder is used to prepare a glove for the dry technique than for the wet one. Excess powder has been proved irritating to tissues.[8] The wet method affords the last minute opportunity to check for pin hole punctures in the glove when it is filled with the germicide. Bacteria on the hand multiply much slower under the wet glove than the dry glove. Investigations have demonstrated the germicidal solution under the glove to be practically sterile after a 45-minute operation, whereas the sweat which collects inside a dry glove teems with bacteria. This is a safeguard in case the glove should be punctured during the operation. In addition to the above advantages, it has been our experience to find the hands in better condition after operating with the wet glove.

### DISINFECTION OF OPERATIVE SITE

Wherever possible, the animal should be bathed one day prior to the operation. Our routine method of preparation of the operative field is first to clip the area with Oster fine clippers; then the site is thoroughly washed with cocoanut oil soap, rinsed and dried. This technique may be modified by rubbing the soap on the hair, followed by shaving instead of the use of clippers.

The germicidal preparation is effected by scrubbing the skin with three alternat-

[8]Byron, F. X., and Welch, C. S.: A Complication from the Use of Glove Powder (Talcum Nodules in Surgical Scars). Surgery, x (Nov. 1941), pp. 766-769.

ing sets of sponges moistened with aqueous Zephiran 1 : 1000 and 70 per cent ethyl alcohol. It is a practical procedure to store small gauze sponges in jars containing Zephiran and others in alcohol.

A sponge should be held in each hand and the operative field scrubbed from the center to its periphery, first with Zephiran and then with alcohol. It is necessary to use two clean, soaked sponges for each of the three alternating spongings. The action of the Zephiran is to emulsify skin fats and loosen desquamating epithelium, while the alcohol rolls off the skin detritus. An acceptable modification of this technique would be to rub the area with 70 per cent ethyl alcohol and permit to dry.

In certain operations, such as the Lacroix ear drainage, it is advisable to prepare the ear 24 to 48 hours before the operation by applying wet germicidal dressing for this period. Aqueous Zephiran 1 : 1000 or a 0.1 per cent aqueous iodine solution are satisfactory.

The application of a tinted antiseptic to the operative field following the described method of preparation is entirely optional and should not be considered essential.

### Chemical Sterilization of Instruments

It is absolutely essential that instruments be thoroughly cleansed before placing them in a chemical disinfectant. Blood, pus, feces, oil, or grease on instruments act as a film that prevents contact of the germicide with the instrument surface. The notion that a good disinfectant will defy any such barriers is wishful thinking and must be discarded as fancy. It is a good practice to soak the instruments first in a solution of soap or special detergent preparation,* followed by a thorough rinsing, before placing them in a disinfectant solution.

The second consideration is to select a germicidal solution that will not injure the material of the instrument and is efficient in action.

The third important factor is to allow the germicide sufficient time to act. A minimum of 30 minutes is required to kill vegetative bacteria.

The formalin preparations already discussed, or aqueous Zephiran 1 : 1000 with 0.5 per cent sodium nitrite are generally good and reliable germicides for this purpose.

### Sterilization by Heat

The use of heat in some form to destroy bacterial life is universally accepted. The usual methods of sterilization by heat in veterinary surgery include boiling water in a "nonpressure sterilizer," dry heat, as in an oven, and steam under pressure, as in an autoclave or pressure cooker.

*Boiling Water.*—Boiling water is most commonly employed for instrument sterilization. The usual equipment used for this sterilization method is simple. If special apparatus is used with plumbing attachments, the latter should be carefully examined for a safe water supply, proper vent, and protected waste. The bactericidal efficiency will be increased by covering all materials to be sterilized with water and thus avoid air pockets. The addition of 2 per cent sodium carbonate or 0.1 per cent sodium hydroxide to raise the pH decreases the corrosive action of the water and lessens the sterilizing time by 50 per cent. Oil and grease must be kept out of the sterilizer. All instruments should be unlocked, so that the water may contact all surfaces. The use of plain boiling water necessitates a minimum period of 30 minutes for the destruction of vegetative bacteria, while alkaline water requires only 15 minutes.

*Dry Heat.*—Hot air ovens are used very infrequently in veterinary aseptic technique. This method is recommended for the sterilization of cutting edge instruments. It is necessary to maintain a temperature of 320 F. for 1 hour in order to effect sterilization.

*Steam Sterilization.*[9] — Saturated steam under pressure is one of the best means of sterilization available. This method has been exhaustively studied and well developed. Unfortunately, the use of autoclaves

*Calgolac—prepared by Calgon, Inc., Pittsburgh, Pennsylvania.

[9]Walter, C. W.: Sterilization. Surg. Clinics of N. America, xxii (Apr. 1942), pp. 333-356.

and steam dressing sterilizers in veterinary practice is limited largely to institutions and some of the better equipped small animal hospitals. Whenever the purchase of this type of equipment is contemplated, careful consideration should be given to design since some of the most elaborately appointed sterilizers are the least efficient. Pressure cookers are used extensively in place of the more expensive autoclaves and their efficient operation leaves little to be desired.

*Control of Steam Sterilization.*—Proper control of steam sterilization of surgical dressings necessitates a consideration of four essentials:[10]

1) The temperature of steam in the sterilizer must be established by the use of a thermometer in the chamber exhaust line. Mixtures of air and steam are undesirable for actual sterilization. When the steam completely displaces the air, the chamber pressure will register 15 psi and the thermometer in the exhaust line will rise to 250 F.

2) The necessary time to assure penetration by the steam of the largest bundle must be predetermined. All bundles should be sterilized for the time required for the largest package.

3) The sterilizer should never be overloaded and the bundles must be packed to provide a horizontal path for the escape of air.

4) It is necessary that the exposure to saturated steam be continuous for the entire sterilizing period. The physical means by which fabrics are actually sterilized by saturated steam is the condensation of steam on the dry fibers and the subsequent heating of the moistened fabric to the temperature of steam. If the continuity of steam exposure is interrupted, the moist zone will cool and require a greater amount of steam for its reheating.

The actual beginning of sterilization within the chamber is indicated by the temperature of 250 F. in the exhaust line. For routine sterilization, 30 consecutive minutes at 250 F. is recommended as an adequate steam exposure.

Fabrics may be dried after sterilization by allowing them to remain in the hot sterilizer with the steam inlet to the chamber closed and the chamber door ajar.

*Sterilization of Rubber Goods, Utensils, and Sutures.*—Rubber goods: The finger spaces and palm of rubber gloves can trap air during sterilization unless a channel is provided for the displacement of air by steam. This is effected by placing a folded, talc-powdered gauze sponge in the cuff of each glove. The dispersed talc is satisfactorily sterilized by this distribution and the powdered gauze can also be used for powdering the hands prior to donning the gloves. In addition to the preliminary preparations, it is necessary to wrap the gloves in such a way that the position of the thumbs is known. The wrapped gloves should be loaded on their edge in the sterilizer with the thumbs up to assure a horizontal path for air displacement.

Proper positioning of other rubber goods during sterilization is equally important. The lumen of rubber tubing should be rinsed with water so that the residual moisture can be converted to steam during subsequent sterilization.

Utensils: Saturated steam is particularly well suited for the sterilization of utensils such as basins since the method is effective and the equipment may be wrapped to facilitate subsequent handling and storage. A convenient operative kit may be prepared by including certain dry goods items inside of the basin. The basins must be placed on their sides in the sterilizer to provide a horizontal path for air displacement during sterilization.

Sutures (silk, cotton, and nylon): It is urged that these types of sutures be sterilized only by saturated steam. This method insures sterility and does not lessen the tensile strength of the materials. Superheating must be avoided, and the sutures should be moistened prior to their sterilization as an additional safeguard.

Unprocessed silk thread can be appreciably improved by dipping the hanks in molten beeswax prior to sterilization. The

[10]Walter, C. W.: The Sterilization of Dressings and Dry Goods. Internat. Abstr. Surg., lxxi (Nov. 1940), pp. 414-419.

hanks can then be placed in cotton plugged test tubes as containers during sterilization and later storage.

*Sterilization of Solutions*[11]—Solutions are by necessity placed in the sterilizer in upright flasks and, despite the obvious contradiction of the principle to provide a horizontal path for air escape, they are efficiently sterilized. Unlike the physical means of both steam pressure and temperature that effect sterilization of textiles, only the temperature factor is utilized to sterilize solution. The temperature of the fluid in the flask approaches that of the surrounding steam and the vaporization within the flask drives off the air. The flask stopper should be either pervious or vented to permit a channel for the escape of air.

Care must be taken not to vent the chamber immediately at the completion of sterilization. This will alter the pressure and result in an excessive vaporization of the solution. To prevent this vaporization, it is recommended that both the steam to the chamber and jacket be closed and the sterilizer permitted to cool to 200 F. before opening the door.

Successful sterilization of solutions also necessitates a complete knowledge of their characteristics. It is inadvisable to attempt sterilization of a chemical that decomposes at a temperature lower than that used for sterilization. The pH is important since many chemicals are stable only within certain hydrogen ion concentrations. It is particularly important to use pure distilled water as a diluent. Incompletely rinsed glassware may add residual alkali from soaps to the solution and cause decomposition. The use of soft glass may permit the development of an alkaline reaction at the liquid-glass interface. For example, dextrose solution can be sterilized without deterioration when the pH is acid and the containers are made of hard glass. If the pH is alkaline, caramelization may occur and the solution will turn brown.

[11]Walter, C. W.: The Relation of Proper Preparation of Solutions for Intravenous Therapy to Febrile Reactions. Ann. Surg., cxii (Oct. 1940), pp. 603-617.

## CONCLUSION

Good aseptic technique does not entail any difficult or cumbersome procedures, but the applications are rational and surprisingly simple. A system of aseptic procedure is not expensive and, as a matter of fact, will save time, labor, and materials. The improved results which follow a shift to good aseptic work will certainly justify the change to any veterinary surgeon.

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Twenty years, ago, in 1922, McCollum and his associates at Johns Hopkins University showed that the calcifying factor known to be in cod liver oil was distinct from vitamin A with which it was confused until that time.—*Vitamin D Digest.*

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The greatest service rendered by the veterinary profession is the prevention of a vast amount of suffering among animals. But, let's not forget ourselves in doing surgical work: Surgery without effective anesthesia should be as unthinkable in veterinary as in human medicine.

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A vaccine for Rocky Mountain spotted fever made from chick embryo, hitherto available only at the Hamilton (Mont.) laboratory of the U. S. Public Service and an antiserum for the sick have been licensed for commercial distribution. The disease is widely distributed throughout most of the United States. Thus for this year 147 cases have been reported by the U. S. Public Health Service, most of them east of the Mississippi.

# Stader Splint Approved in Human Surgery

AFTER DEMONSTRATING his splint for years before his peers, of the veterinary profession, Otto Stader, Ardmore, Pa., onetime Wisconsin and Illinois specialist in bovine sterility, has made the headlines of the medical and surgical press. The Stader splint is no longer a fantastic idea. Its use on a large scale in the Navy and in certain large surgical clinics where it stood the crucial test of leading surgeons, brings deserved credit to a member of the veterinary profession and to the profession itself.

A three-page article in *Science News Letter* (Nov. 14, 1942), which usually devotes but a few lines to each subject, indicates the interest Dr. Stader has aroused in the field of science through his ingenious bone-setting and bone-retention apparatus. The article (*loc. cit.*), entitled "Quick Repair" by Elsie McCormick, gives due credit to the inventor, to wit: "The splint was devel-

*—Photos by Dr. Stader*

Fig. 1—Reprint from the April, 1941 issue of the Journal, page 312, showing the use of the Stader splint in cats, dogs, horses and man.

oped by a veterinarian, Dr. Otto Stader. After a long experience with animals, it was applied to human beings for five years by two leading surgeons at Bellevue Hospital in New York. Since December (1941), it has been in use at the Philadelphia Naval Hospital. . . . Judging from these trials, the Stader splint is likely to bring about a tremendous change in the treatment of broken jaws and of the long bones of the arms and legs."

The Stader splint, the author goes on to explain, is the outcome of previous attempts

—*From Science News Letters*

Fig. 2—Men laugh, talk, chew, and go about their business as usual shortly after the Stader splint is adjusted to a fractured mandible.

to use steel pins for bringing and holding fractured bones in apposition. The one is the pinning method of the Swiss surgeon, Steinmann, introduced into the United States in 1904 by Dr. Godivilla, and the other is the improvement made by Drs. Anderson and Haynes. In the Steinmann method, the pins were driven through the entire leg. The improvement of Anderson and of Haynes consisted of driving a pair of steel pins, V-like, into each segment for handling and retaining the bone in its normal position. The Stader invention is the use of the two pairs of protruding pins inserted V-shape, for attaching an adjusting apparatus by which the segments can be swung not only to their normal axis, but also into exact end-to-end juxtaposition which neither inherent nor outer influence can disturb.

The article stresses the prospect of more successful treatment of leg fractures in

—*From Science News Letters*

Fig. 3—This sailor carried a 40-lb. suitcase the day after sustaining a fracture of the radius.

solipeds which, needless to state here, are generally regarded as lethal injuries. "A mare who grazed serenely in a meadow while her leg was healing" is cited. In dogs, the splint needs no boosting; more than 1,200 cases, of which the majority could stand, walk, and run almost immediately after treatment, are the proof of its usefulness in small animal medicine.

It was Drs. Kenneth M. Lewis and Lezter Breidenbach of New York University, College of Medicine, who first studied and employed the Stader splint in human patients. Studies and usage covering a period of five years preceded their announcement of results in *Annals of Surgery*, October, 1942. The precaution of these surgeons against drawing premature conclusions, characteristic of leading figures of medical science, is obviously the best testimonial in behalf of Stader's invention.

A survey of the development of the Stader splint is none too complimentary to the veterinary surgeons since few reports, except those of the inventor, have filtered into the pages of veterinary literature. Obviously, it has not been commonly used. The technics of application are by no means simple, and perhaps the cost has been a deterrent. A splint for a Great Dane would not be much use for a handful of Toy, nor the intermediate-sized dogs filing through the surgery of the average veterinarian.

If, in the natural course of events, veterinarians cannot afford to provide themselves with an assortment of Stader splints suitable for immediate use when broken legs come along, the losers will be the injured animals. And, may we ask, has the veterinary instrument business been taking a nap or was it something unknown that has kept the Stader splint off the market all of these years? If the well-known group of veterinary supply houses are taken as the criterion, it has not been catalogued in the usual way of introducing a useful appararatus to the veterinary profession.

## Dilutor for Jack and Stallion Semen

Ever since artificial insemination in farm animals came into general use, attention has been focused upon the use of dilutors which will serve the dual purpose of improving the keeping properties of semen and of its distribution among more females to be impregnated with a single ejaculation. In this respect, credit is universally accorded to the Russians, particularly to the work of Milovanov (1934 and 1936). The work of Philip and Lardy (1940) and of Berliner (1940, 1941, and 1942), in this country is also pointed out as significant. The serum life-preservers are based mainly upon the energizing action of glucose of which semen contains but little. Inorganic salts of sodium and potassium made up into an aqueous solution for the reception of the semen collected in artificial vaginas or condoms are but adjuvants of the formulas. While pregnancies have been obtained with semen dilutors after as long as 150 hours, 24 to 48 hours is the deadline of practical use according to public announcements and published information.

Berliner (*Journal of Animal Science*, Nov. 1942) prescribes a dilutor composed of glucose, potassium and sodium tartrate (Rochelle salt), egg yolk, and water. To a bottle containing 100 cc. of sterile water, 0.67 Gm. of Rochelle salt is added, together with the yolk of one hen's egg. The author recommends that the glucose and the salt be contained (for convenience) in a half-ounce gelatin capsule and inserted—capsule and all — into the bottle containing the water. The egg yolk is then added, and the solution after shaking is pasteurized. One part of jack or stallion semen to 2 to 10 parts of this solution constitutes the artificial ejaculate for immediate or early use.

For storage, a dilution 1:3 is preferable. If refrigeration is required as in the case of delayed use, the diluted semen is kept at a temperature of 2 to 5 C. At 5 to 10 C. the diluted semen is almost completely congealed in 30 to 40 minutes. It is reheated for use, in either case.

From this method, 16 out of 19 mares were "settled" after 2 and 3 inseminations during one heat period. Two mares became pregnant from one insemination made on the second day of heat and again with a 49-hour semen on the fourth day. Dose: approximately 2 billion sperms.

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Blood plasma transfusions are given to wounded soldiers right on the battlefield without typing.

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The biggest task of the veterinary profession is promoting the proper use of veterinary science, on the farm and in the home, against opposition based on the doctrine that "any farm hand can vaccinate an animal," in other words, on the strange belief that veterinary practice is largely a matter of handling the hypodermic syringe.

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Thanks to the doctrines of veterinary science, farmers can raise ton litters of pigs in six months, 100-pound lambs in 100 days, and cows which give more than 41,000 pounds of milk in a year.

# CLINICAL DATA

## The Sulfonamids — Therapy in Practice

JOSEPH A. S. MILLAR, V.M.D.
*Deal, New Jersey*

IN THE DECADE that followed the announcement by Meitzsch and Klaus in 1932 of their discovery of sulfonamide chrysoidine, a synthetic chemical compound known as 2 : 4 diamine-azobenzene, 4 sulphonamide, there have been numerous reports on this drug and its related chemotheraputic agents. It was not until 1935, after Domagk had announced the properties of this agent, that it became available to all professions. It will be my purpose to bring to your attention as much material as possible which I believe shall be of some practical value now and in the future.

Naturally, in a period of less than seven years, large-scale, clinical research and employment in practice has offorded a tremendous opportunity for the collection of data on these agents. Time has aided in giving the older sulfonamids a rather severe test —while the newer compounds are still in the experimental stage. I am of the opinion that we should use them with more caution.

It seems essential and important to review some of the newer thoughts and opinions of sulfonamid therapy published within the last few months. This has been taken largely from the writings on human medicine. However, there is merit in them and they are worthy of consideration in our field.

Hamburger, Schmidt and Reugsegger (1942) reports that "Experimental studies both *in vivo* and *in vitro* have shown conclusively that sulfonamid-sensitive pneumococci can be readily converted in organisms that are highly resistant to these drugs. Available reports suggest that this may also occur during the use of sulfonamids in treating human infections." Is there any reason why we as veterinarians cannot be confronted with such a problem in our various fields of practice? This might be an explanation for our failure to succeed with this treatment in a certain percentage of cases.

Little (1942) states that along with the dramatic response to this new chemotherapy, the proper study of the toxic action of the various drugs has been neglected. It is known that the sulfonamids exert a definite action in the nervous system, sometimes with resulting damage. He further states:

> It is generally agreed that the mode of action is primarily bacteriostatic. By some means the sulfonamids interfere with the rate of growth of the bacterial cells, possibly through disturbance of the enzyme system within the cell. The toxic symptoms which are manifested in man by nausea, vomiting, diarrhea and cyanosis, originate in the central nervous system. The magnitude of these reactions is not an accurate indication as to the seriousness of the toxic effect on the nervous system.
>
> Animal experiments seem to indicate that all members of the sulfonamid group have a toxic effect on the nervous system, the parent substance, sulphanilamide, being the least toxic, and some of the newer derivatives being the most toxic. The toxic effects are probably an integral part of the primary effect of the drugs on all cells, bacterial or human. It has been suggested that some of the deleterious nervous and mental effects may be dependent on cerebral anoxia resulting from hemoglobin, attaching itself more readily to the sulfonamide group than to oxygen. Intermittent administration of a single sulfonamide or successive administration of different sulfonamides seems to predispose to the development of toxic nervous system symptoms,

possibly through a sensitization process. A review of the clinical reports, in general, confirms the results of the animal experiments. The drugs appear more neurotoxic in the presence of pre-existing disease of the nervous system.

Nelson (1942) reports that sensitivity to sulfonamids is gaining importance. The earliest reaction observed appeared after a lapse of eight or nine days, on resuming sulfonamid therapy following a previous course of medication.

Before considering the various species of animals and conditions aided by the use of sulfonamids, let us consider a few important associated facts. The sulfonamids are absorbed through the gastrointestinal tract and taken up by the circulation. The blood concentration is dependent upon the rate of entry and rate of exit. If speedy obsorption is desired for immediate maximum blood concentration for emergency purposes, sodium salts are used intramuscularly or intravenously. Sulfanilamide and sulfathiazole both reach a high blood concentration quickly and lose it rapidly. The blood concentration of sulfapyridine is increased and decreased slowly.

Finland, Straus and Peterson (1941) report that the rate of absorption and amount of blood concentration of sulfadiazine is higher and more lasting in man, while in the dog it is slower. Marshall (1940) and his associates state that sulfaguanidine is absorbed from intestinal tract in low concentration.

Cerebrospinal concentration of sulfonamids is as follows: Sulfanilamide is approximately 75 per cent of a simultaneous blood examination; sulfapyradine is 60-80 per cent of that of the blood; sulfathiazole has a low concentration; sulfadiazine, according to Long (1941), appears in a concentration of 60-70 per cent of the blood.

With the occurrence of unpleasant symptoms from sulfonamids, the use of nicotinic acid or vitamin B is helpful. It has also been noted that a protein-deficient diet increases the blood concentration of sulfonamid which in turn affects the toxicity of the drug. Still another fact of importance to be remembered is that in medicating the dog, it is known that sulfonamids are not conjugated as in the cat and man.

## Dogs

In the field of canine practice, I believe we have had a greater opportunity to use and try all the sulfonamids. The dog has proven to be a useful experimental animal. Sulfonamids take on added importance when we consider the marked aid which they have given us.

The proper dose of sulfonamids is important and depends on age and condition of the animal. Morris and Allison (1940) suggest the dose of 3.5 gr. per pound of body weight of sulfanilamide be used for the first 24 to 48 hours, depending on the response; 2.5 gr. per pound of body weight are administered in divided doses for the next few days. Ecker (1940) states that he observed only rare cases exhibiting toxic symptoms. The dosage suggested is 15 gr. per 10 lb. of body weight for 2 days, 10 gr. per 10 lb. body weight for 3 days, and 5 gr. per 10 of body weight for 5 to 7 days.

Conditions in which sulfonamids have been helpful are respiratory disturbances: coryza, tonsillitis, bronchitis, pneumonia, septicemia, colitis, cystitis, nephritis, mastitis, metritis and also eye and ear affections.

With neoprontosil, I believe I have experienced better results in tonsillitis and some septicemias when using a dose of 2 cc. per 5 lb. of body weight for the first 24 hours and decreasing doses by one-half and one-quarter on subsequent days. Medication *per os* instead of by the intravenous route may be the one of choice after sufficient concentration is obtained.

Morris and Murray (1940) reported sulfanilamide in the afore-mentioned doses was decidedly useful in meningoencephalitis of distemper with 93 per cent recoveries.

Hodes and Strong (1942) report that in the treatment of meningitis it is essential to have a blood concentration sufficient to cope with the spread of infection as quickly as possible without overdosing. They give the opinion that sulfathiazole is superior to sulfonilamide or sulfadiazine.

In the treatment of infections of the

genitourinary tract, the sulfonamids have proven most effective. Khuen (unpublished), and Morris and Franklin (1939) stress the need for bacteriological diagnosis in urological conditions in order to reconcile clinical findings with proper therapeutic procedure. It has been demonstrated that a morbid kidney does not excrete the agent as efficiently as a normal one.

Clemenho, McChesney and Miner (1941) state that continued oral administration of sulfathiazole in dogs produced only a mild impairment of the renal function for 48 hours after the drug was discontinued. Sulfathiazole is the drug of choice in kidney infections, although sulfanilamide may be helpful in relatively low concentrations.

Schwartz and associates (1941) mentioned, in the uses of sulfathiazole and sulfadiazine, that fewer crystals were observed in human urine when alkalis were administered. Raines (1942) substantiates this observation. He further stated that if anuria developed, the secretion of urine did not commence until the temperature had risen to 103 F. Consequently, fever therapy or diathermy should be considered a necessary aid in this condition. It has also been observed that dehydration and malnutrition may predispose to urinary complications with some sulfonamids.

### DOSAGE

Ketchersid (1940) recommends the use of sulfapyridine in septicemia in dogs, using 1 gr. per lb. body weight in 4 divided doses for 24 hours, decreasing this amount daily by 50 per cent. Bryan[18] suggests 50-60 gr. doses divided into 4 to 5 administrations for large dogs, and 20 gr. for toys. Good results were reported in treating distemper in combination with serum.

Bryan (1942) recommends the same doses for sulfathiazole in the dog and reports it is apparently slower in action than sulfapyridine.

Schroeder (unpublished) suggests doses of sulfadiazine in the following amounts: 0.1 gr. per kilo (2.2 lb.) of body weight repeated every 4 hours until temperature drops to normal and then it is continued for 38 hours, with 6 hour intervals, in the amount of 0.05 gm. at which time it is discontinued. This did not prove effective when tried by Millar and Ticehurst (personal research) in a distemper-like infection.

Bryan (1942) suggests the following dosage of sulfaguanadine: large breeds such as Danes, Shepherds, Collies, Newfoundlands, Chows, Setters, 1.0 to 2.0 Gm. (15-30 gr.); small dogs, 0.5 to 1.0 Gm. (7½-15 gr.) 3 or 4 times a day; while cats and toy breeds received 0.325 Gm. (5 gr.) 4 times a day. He and Herrick (1941) reported encouraging results in gastroenteric infection of the dog.

### OTHER USES

Light and Frey (1939) report an interesting hemolytic streptococci infection in a Great Dane characterized by edema with response to sulfanilamide treatment. Landsberg (1942) reports helpful results with sulfanilamide in treatment of canine piroplasmosis.

Eye affections such as conjunctivitis, keratitis, ulcerative keratitis, as well as some of the deeper infections, respond to sulfonamid therapy. Local treatment may be supported by internal medication. In certain ear infections, the local application of powder or a combination ointment may help where other treatments have failed.

Dermatitis in its various forms and furunculosis may respond to sulfonamid therapy, depending on the nature, course and type of condition.

Heckel and Hori (1939) state that, contrary to reports, there is not any appreciable effect on the total percentage of live spermatozoa due to the use of sulfanilamide. While I have not seen reports in regard to the other sulfonamids, it might be of value if some one would question their effect on breeding stock.

The sulfonamids have proven effective in the treatment and control of gas gangrene in civilian and military life. Likewise, it is effective in the dog. The treatment should

be used in combination with other effective agents.

## Cats

Sulfonamid therapy is likewise efficacious in cats. It has proven to be an effective agent in the treatment of distemper, septicemia, pneumonia and endometritis. Doses range from 10 to 20 gr. for sulfanilamide, sulfapyridine and sulfathiazole. Treatment at times has been reinforced with the use of biological agents and antipyretics. Gordon (1939) reported that septic metritis responds to sulfanilamide. Starke (1940) reported the successful use of sulfanilamide and neoprontosil in pneumonia. Local application in infections and wounds is useful therapeutic practice.

## Sheep and Swine

Foster, Christesen and Habermann (1941) state that sulfaguanidine was of value in the control of coccidial infection of sheep. Cameron (1942) reports the same agent was helpful in giving a more favorable prognosis in the treatment of enteritis in swine. The dose used was 1.0 Gm. per 20 lb. of body weight.

## Poultry

Levine (1941) reports sulfaguanidine helpful in the treatment of coccidiosis. Farr and Allen (1942) found that sulfaguanidine was an effective aid in certain stages of cecal coccidiosis. Delaphane and Stuart (1941) report that sulfanilamide and sulfapyridine were toxic to chickens but sulfathiazole in 2.0 Gm. daily doses to adult birds was effective in the control of infectious coryza. Improvement was noted in 48 hours.

## Cattle

Sulfonamids have proven their value in cattle. A source of severe trouble to the dairyman and veterinarian has been calfhood diseases. Wise and Anderson (undated) recommended the use of sulfaguanidine in aqueous suspension with 5.0 Gm. as the initial dose; 3.5 for the second dose; 2.5 Gm. 4 hours and 6 hours later; and then continued at these intervals until the diarrhea subsides. As the treated calves seemed weak with less appetite for two days, it was necessary to feed them with milk of the dam.

Thorpe and Shigley (1942) report fair to good results in the treatment of scours with sulfoguanidine. The dosage used is as follows: calves 75 lb. and over, 0.15 Gm. to 0.17 Gm. per lb. of body weight divided into 3 equal doses; calves 75 lb. and under, 0.13 Gm. per lb. of body weight in like manner. The dose was reduced on the third day by 0.05 Gm. per lb. of body weight. An overdose was observed by these clinicians to result in nephritis.

Ehlers (1940) reports good results with sulfapyridine in calf septicemia, using the following dose: first and second dose, 5.0 Gm. each; third dose, 4 Gm.; fourth dose, 3 Gm.; fifth dose, 2 Gm.; and for the sixth and subsequent doses, 1.0 Gm. Toxic symptoms were overcome by feeding sodium bicarbonate. The interval of dosing was not given. Transfusion with dam's blood was valuable in maintaining patient's condition. Gibbons (1942) recommends 5.0 Gm. twice a day for the same condition.

Thorpe, Shigley and Anderson (1942) report good results in treating calf pneumonia with sulfapyridine. The dosage used was as follows: calves up to 70 lb., 0.05 Gm. per lb. of body weight; 70 to 100 lb., 0.06 Gm. per lb. of body weight; 100 lb. or over, 0.07 Gm. per lb. of body weight.

McPeek and Armstrong (1941) report that in coccidiosis of calves, sulfanilamide in the dose of 1.0 Gm. per 20 lb. of body weight caused a disappearance of oöcysts in subclinical and clinical cases 4 or 5 days after instituting that therapy.

Farquharson (1940) reports the successful use of sulfapyridine in calf diphtheria. Improvement was noted within 24 hours after treatment was started. The average course of treatment was 6 days. The dosage recommended is quoted as follows:

> Therapeutic effectiveness is accomplished by attaining and maintaining a blood level of at least 5 mg. per cent for the duration of treatment. This can be accomplished by giving initially either .06 Gm. per kilogram or 0.03 Gm. per lb. of body weight of sulfapyridine

sodium, intravenously, supported by oral administration of the drug every four hours, so that 1 gr. per lb. of body weight is given over a period of 24 hours. In three or four days this dose can be reduced to one half and continued for the same period of time.

Sulfonamid therapy has been employed in mastitis with varying results, depending on the etiologic factor, condition of the udder and the duration of the infection. Abbott (1937), when the dosage was unknown, was the first veterinarian to report the use of sulfanilamide in mastitis.

Klein and his associates (1939) report various instances wherein sulfanilamide was helpful to a certain degree in mastitis. In their report on dosage, rate of absorption and physiological action, they state:

Blood and milk samples collected simultaneously showed that the peak concentration was reached in 8 to 12 hours after administration of the drug. A concentration of 1.0 mg. or more in 100 cc. was reached in from 1 to 3 hours and remained at that level for 36 to 48 hours after administration. Sulfanilamide was observed in milk simultaneously with its appearance in the blood. A comparison was made between 1 administration and 2 or 3 doses of the same amount. For general purposes this further indicated that a single daily dose every 24 hours was sufficient to maintain the necessary effect.

Little (1939) found that sulfanilamide was an ineffective curative agent in the treatment of bovine mastitis.

Miller and his associates (1939) found: (1) A concentration of 15 mg. or more in 100 cc. could be produced in blood and milk by giving an initial dose of 0.4 Gm. per kilogram which could be maintained by subsequent dosages of 0.15 to 0.2 Gm. per kilogram at 12 hour intervals. (2) Dry cows concentrated sulfanilamide more rapidly in the blood than lactating cows. (3) No bacteriacidal action in *Brucellus abortus* infection in the udder of lactating cows was indicated by direct bacteriological culture of milk. (4) The administration of large dosage resulted in a decrease in the appetite and milk production. Temperature was observed in these animals on immediate termination of treatment.

Bryan and Arnold (1940) confirmed the opinion of Little. They stated that sulfanilamide in continued large doses was rather toxic, adding that a solution of calcium gluconate might be a reliable antidote for this toxicity.

Hamann and Huddleson (1939) report that prontosil and sulfanilamide did not have any appreciable effect on *Brucellus abortus* infection in the udder that could be detected by bacteriological examination.

Clinicians are of the opinion that sulfanilamide is of some value in correcting symptoms of acute mastitis and apparently an aid to recovery. It is, however, of no value in the chronic type.

Gray (unpublished) recommends the use of sulfanilamide in the treatment of shipping fever, septicemia and some forms of mastitis in doses of 300 to 600 gr. daily in one dose. This dose is reduced with a drop in the temperature. Herron (unpublished) concurs that doses of 600 to 1,200 gr. cause no apparent toxic manifestation.

## Horse

Arnold (1939) reports that in the equine species the data submitted is not conclusive. The drug appeared to have some merit in acute septicemia, while chronic infections were not particularly helped. Small, repeated doses or a single, large dose caused no toxicity but large, continued doses had a cumulative effect. Douglas and Walker (1939) reported that neoprontosil controlled strangles when given in the early stages. The dose administered was 25 cc. 4 times daily, intramuscularly. Herron (unpublished), in using daily doses of 360 gr. of sulfanilamide along with supportive treatment, reports encouraging results in purpura hemorrhagica.

Gochenour, Stein and Osten (1939) reported that sulfanilamide in equine infectious anemia failed to show specific action against the virus, but did not produce any toxic reaction. However, these investigators found out that:

(1) 50 Gm. failed to cause toxic symptoms when given in equal doses 6 hours apart, or in single doses of 50 to 75 Gm. (2) Following intravenous injection, blood levels approximate same as other animals when same dose in proportion to body weight is used

with similar decrease in blood level as in man and dog. (3) Following administration *per os*, there is a long latent period of absorption. (4) The horse conjugates sulfanilamide at the same rate as man.

### ACTINOMYCOSIS

Martin (1942) recently reported the presence of actinomycosis in the dog and cat which had previously been reported by other authorities. The locations of lesions were the subcutis, lungs and liver, and tissues of abdominal cavity. The lesions in the cat were in the small intestine. Dolson, Holman and Cutting (1941) reported three cases in man in which the employment of sulfanilamide was indicative of being the deciding agent. Wilkinson (1941) reported similar response to this therapy in a child. Could this treatment be of practical value in small and large animal practice for actinomycosis?

### LOCAL APPLICATION

Application of the various sulfonamids to the unbroken skin and abrasions and wounds has been common practice for the past few years in human and veterinary medicine. If the injury is associated with shock, the shock is treated first. Key and Frankel (1941) state that sulfanilamide, sulfapyridine and sulfamethylthiazole are tolerated readily in powder by the joints, muscles and connective tissues. These agents are bacteriostatic and not bacteriocidal in wounds, and the proper procedure is to sterilize them before using in a clean wound. Some inhibition to healing is manifested in early stages. For local use, sulfanilamide seems to be the drug of choice because of its greater solubility. Appleby (1941) describes the successful use of sulfanilamide solution topically. Bryan (1942) reports good results in the local use of sulfapyridine.

### SURGICAL APPLICATION

It is of extreme importance to the surgeon, however, that the use of the sulfonamids should not replace careful and efficient technique and postoperative care. Wounds and compound fractures should be cared for in the modern and advanced way to insure the highest possible percentage of recovery. Careful technique and respect for tissue injury will pay dividends. Sulfanilamide, sulfapyridine and sulfathiazole have all been used with success in surgery.

In abdominal surgery, sulfonamid therapy has been used successfully following hysterectomy, cystotomy, and intestinal obstructions. I have used it in dogs without any evidence of toxic effect. Farquharson (unpublished) mentions that in the dog sulfanilamide is not well tolerated in the peritoneal cavity in excess of 2 gr. per pound of body weight. In the cat, toxic symptoms were rather severe after approximately 0.75 to 1.0 Gm. of sulfanilamide were placed in the peritoneal cavity. Both cases recovered with the use of doses of vitamin B. Absorption by peritoneal surface is extremely rapid.

Chambers (1942) and has associates have announced the use of microsrystals of sulfathiazole. These crystals will pass through a 26-gauge needle. It is used either in a powder or in a 10 to 20 per cent suspension. In the latter form it has the distinct advantage of being injectable into small, round openings or into cavities with ease, and without clumping. In its application, although no attempt was made to sterilize the powder or suspension, no untoward results developed.

Ryan, Bauman and Mulholland (1942) report the blood concentration and urinary excretion following intraperitoneal use of sulfadiazine. The use of 10 Gm. revealed that the blood level was maintained for 48 hours; 20 Gm. maintained the level for 84 hours and 25 Gm. for 96 hours. No postoperative complications or toxic manifestations were observed.

Sutton (1942) states that sulfathiazole powder causes peritoneal irritation in the dog and sodium sulfathiazole produces dense peritoneal adhesions.

In conclusion I wish to state that (1) sulfonamids have a definitely effective action narians; (2) we should keep abreast with the progress made in sulfonamid therapy: and (3) we should use sulfonamids with more caution and less abandon.

## Dicoumarin —(3,3'-METHYLENE-BIS-4-HYDROXYCOUMARIC)

Dicoumarin, the decoagulant principle of spoiled sweet clover, isolated and synthesized by chemists of the Wisconsin Agricultural Experiment Station, takes its place among the notable medical discoveries along with sulfanilamide, vitamin K, thiamin, niacin, and other specifics which have brought new glory to the field of chemotherapy in recent years, and incidentally to the early studies of veterinarians on the clinical state known in veterinary medicine as sweet clover poisoning and described as such in the literature since 1922, 1924 and 1929, when that hemorrhagic catastrophe began to attract attention through the increased use of sweet clover as a forage crop. Scofield, of the Ontario Veterinary College (1922 and 1924), and Roderick and Schalk of the North Dakota Agricultural Experiment Station (1929 and 1931) were the first to signalize and incriminate spoilage of that legume as the cause of the disease and to exempt sound sweet clover hay and sweet clover pasture as the cause.

In reducing the coagulation and prothrombin time, coumarin serves more useful purposes in human than in veterinary medicine since postoperative embolism and infarcation are either rare or unrecognized in clinical animal surgery. In fact, the uses of this sensational chemical in veterinary surgery lie in the future, pending closer observations of the postoperative sequels where reduction of prothrombin time is indicated. Its appraisal in the medical field is shown by the publication of three extensive articles on the subject in a recent single issue of the *Journal of the American Medical Association* (Nov. 28, 1942).

Coumarin is a white crystal procurable on the drug market and is already widely employed in human surgical operations where the risk of deadly embolism is great. Its main indications are:

Coronary thrombosis
Postoperative pulmonary embolism
Postoperative thrombophlebitis
Hysterectomy (abdominal)
Idiopathic thrombophlebitis
Arteriosclerosis obliterans
Diabetic gangrene (sudden)
Arterial thrombosis
Post-thyroidectomy

Inasmuch as these are not common affairs in the routine work of a veterinarian, this new decoagulant, like Dam's vitamin K which has the opposite effect on prothrombin and coagulating time, precise and reliable as it is, must wait until opportunities for its use in animal medicine are developed.

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## Pregnancy Disease in Ewes

If there is to be an increase in the production of lambs, one important requirement is the prevention of pregnancy disease in ewes.

Pregnancy disease is not infectious or contagious; it is a ketosis, and ketosis develops as a result of improper feeding. Proper feeding of the ewe should begin at breeding time, not after the lamb is born.

Parasites use feed and decrease the amount available for the sheep. Better feeding, care, management, and parasite control will prevent pregnancy disease and also produce more wool, stronger lambs, and more milk. The ewe's milk is the best and cheapest feed for lambs. Sheep are not magicians; the sheepman must supply pasture, hay, grain, water, and salt.

The exact amount of hay and grain required depends on the pasture available, the physical condition of the ewes, and the weather conditions. During the average season in Kentucky, it is necessary to feed from 1 to 2 lbs. of hay per ewe per day, beginning sixty days before lambing, and from one-fourth to one-half pound of grain per ewe per day beginning thirty days before lambing. Perhaps the best ration for the average farm flock in this area is yellow corn and a legume hay such as alfalfa.

If a mixed hay or other roughage is used instead of a legume hay, the following grain mixture is suggested:

| | |
|---|---|
| Yellow corn | 400 lb. |
| Oats | 200 lb. |
| Wheat bran | 100 lb. |
| Linseed oil meal or | |
| Soybean oil meal | 100 lb. |

In the United States, the yearly feed requirements for an ewe and her lambs, in addition to pasture, are: hay, 200 to 600 lb.; grain, 50 to 100 lb.; salt, 10 to 15 lb., and clean water (available at all times).

Forced exercise has been emphasized as a good practical way to prevent the disease. A certain amount of exercise is always beneficial; however, exercise in itself will not prevent pregnancy disease.

There is no vaccine beneficial for pregnancy disease nor for parasitism.—*W. W. Dimock and F. E. Hull, Lexington, Ky.*

## Alcohol in Veterinary Medicine

Alcohol, that is, ethyl alcohol ($=C_2H_5OH$), is erroneously classified as a stimulant in popular usage when, as a matter of fact, it belongs in the opposite column, the column of depressants. Because of its psychic effects in man, there is no excuse for classifying even that part of its dynamics to stimulation, since the generation of mental, sensory and motor impulses is accomplished by inhibition (depression). The flushed peripheral circulation is due to vascular relaxation; the quickened pulse to excitement and movement (not to direct heart stimulation, and this action is wholly absent in animals); and the belief that intellectual and physical power is stepped up is universally conceded to be fallacious. In short, alcohol, therapeutically, in veterinary medicine is a depressant of the first order —always. An exception may be the small (nutritive) dose, too small to make noticeable impressions. In that event, alcohol perhaps has the nourishing effect of carbohydrate. Its use locally and as a solvent is the subject of another thesis. As a stimulant, internally, it is adduced in error, for the treatment of sick animals.

Epitomized, in man alcohol plays fantastic gymnastics on his psychological functions, wrecks (and not perhaps) his somatic machinery, and pays off in the practice of medicine by giving a transient "something" commonly thought to be stimulation. In animals, the benefits derived add up to figures ranging around zero, and this we set down from good authorities and personal experiences. One does not need ethyl alcohol for internal use in the practice of veterinary medicine.

## Enlarged Spleen in Swine Erysipelas

Last July 4, we were called to a farm in southern Fayette County to halt disastrous losses in a herd of swine which, 11 days previously, had been vaccinated against hog cholera. There were 254 shoats and pigs in the herd, 19 of which had died within 48 hours. The shoats were 3 months old and averaged 100 lb. There were about 50 6-week-old pigs among them. All of them were running in bluegrass and had access to a clover-alfalfa field and a self-feeder containing ground yellow corn, wheat, and other concentrates.

The healthiest shoats sickened suddenly, showing inappetence, diarrhea, arched back, standing as in deep thought, taking short strides, or lying down away from the herd. When aroused, they would run away. The temperatures varied from 106 to 108 F.

Postmortem examination of 6 of the 19 dead shoats and of 1 freshly killed revealed spleens engorged to three times the normal size, diffuse hemorrhage of the gastric mucosa, a large amount of fluid in the stomach and intestines, congested skin, and petecial hemorrhages of the kidneys. The petechiae were probably due to the hog-cholera vaccination.

The spleen of the freshly killed shoat was excised, placed in a sterile jar, and presented to the state diagnostic laboratory at Reynoldsburg.

Dr. W. L. Ingalls of the laboratory reported that culture mediums were inoculated and two pigeons injected with a suspension of the affected spleen. Stained preparations and slides revealed short gram-positive rods which, morphologically, were not precisely identical with the given description of *Erysipelothrix rhusiopathiae*, although strongly suggestive.

One of the pigeons died on the sixth day and one of the mice on the eighth day. Cultures from these showed typical growth on

standard agar, which, on staining, revealed short gram-positive rods.

Subcultures were made in broth and a 48-hour growth was used to inoculate pigeons. Two pigeons were inoculated with 0.5 cc. of this culture. The one receiving also 0.5 cc. of anti-swine-erysipelas serum recovered, while the one receiving no serum died in four days. The organisms recovered were gram-positive rods.

Treatment of the shoats consisted of separating the visibly sick and of giving those with a temperature of over 105 F, 30 cc. of anti-hog-cholera serum (mainly as a blood transfusion) and 40 cc. of anti-swine-erysipelas serum. The healthy shoats were given 30 cc. of anti-swine-erysipelas serum and 30 cc. of anti-hog-cholera serum, and the pigs 20 cc. and 30 cc., respectively. The subsequent losses were limited to two shoats.

The outbreak was pronounced one of acute swine erysipelas, believed to be due in part to lowered resistance during the reaction to hog-cholera vaccination. In 20 years of practice by the senior author, no similar lesions or symptoms had been observed. Only one case of swine erysipelas has been previously reported in this region. —*Wm. Bolton, D.V.M., and E. W. Bolton, D.V.M., Washington Court House, Ohio.*

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## Infectious Balantidiosis in Swine

During the latter part of July, a farmer in a town near Philadelphia purchased several young pigs and introduced them into his herd.

Within the course of a few weeks, he noticed that all of the pigs, but none of the mature swine, developed a watery diarrhea, later becoming blood-tinged. Anorexia and extreme polydypsia were accompanying symptoms. The pigs were reluctant to move, were gaunt, had a rough coat, and showed a marked lassitude. These symptoms were manifest in 10 pigs, all of which finally died within a period of from one to three weeks. Two pigs survived for one month, and two others, showing the same symptoms, recovered, but were severely stunted.

The two pigs which had survived for one month were presented to the ambulatory clinic of the School of Veterinary Medicine. In addition to showing the symptoms previously mentioned, they were anemic, and showed pronounced dehydration.

A fecal examination revealed a heavy infestation of *Balantidium coli.*[4]

The necropsy disclosed a severe hemorrhagic colitis and generalized enteritis. Histopathological study of a section of the small intestine and colon determined a marked penetration of the swollen enteric mucosa by the parasite.[5]

According to Ray,[2] this parasite is found universally in swine, but usually it produces no recognizable lesions. It rarely causes any harm in pigs.[1]

Two varieties of *Balantidium coli* are konwn: *Balantidium coli var. suis* and *Balantidium coli var. hominis.* It has not been determined whether they are individual species, and it is difficult to differentiate the two varieties.[2]

The parasites pass from the body of the host in the feces. Some secrete a heavy cyst wall and, becoming encysted, are able to withstand environmental hazards to a far greater extent than the nonencysted Balantidium. The pig becomes infected by ingesting the cyst. In the intestine, the cyst wall is dissolved, and the young ciliate emerges.[3]—*John D. Beck, V.M.D., William B. Boucher, V.M.D., and George C. Poppensiek, V.M.D., University of Pennsylvania School of Veterinary Medicine.*

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[1]Anthony, David J., M.R.C.V.S., D.V.S.M.: Diseases of the Pig and Its Husbandry. Baltimore, Williams and Wilkins, 1940, p. 123.

[2]Ray, J. D.: Swine Balantidiasis, Veterinary Medicine, xxxii (Sept. 1937), pp. 392-396.

[3]Spindler, L. A.: Internal Parasites of Swine. (In "Keeping Livestock Healthy; Yearbook of the United States Department of Agriculture, 1942. Washington, D. C. U. S. Gov't Printing Office. 1942, pp. 770-771).

[4]Determined by David Coffin, V.M.D., Department of Pathology, University of Pennsylvania School of Veterinary Medicine.

[5]Determined by Harry M. Martin, V.M.D., Ph.D., Department of Pathology, University of Pennsylvania School of Veterinary Medicine.

# EDITORIAL

## The Veterinary Service of the United States

The veterinary services of the United States is divisible into three definitely distinct units:

(1) *The veterinary profession* represented by a system of formal medical education, and the group of graduates holding the stated college degree, who are authorized to practice veterinary medicine and surgery under state laws or under regulations framed by the federal government for its employees.

(2) *The nostrum industry* which manufactures livestock remedies for distribution directly to the owners of animals, along with "technico-commercial" direction for their use. This unit has components ranging from the downright faker to the disloyal respecter of science. It thrives on the arguments of literature, advertisements and salesmen, plus mass ignorance of medical science. Though much of its output goes from factory to user, its connection with the legitimate drug trade is close and vast, and its flirtations with the professional group are not rare, because the nostrum industry is a qualified deceiver. It plays both ends against the middle and thereby catches a considerable percentage of the veterinary profession in its web.

(3) *The agricultural colleges* in the United States have been developing a veterinary service of their own ever since the birth of the veterinary profession. In fact, the two were born at the same time. They developed in the same nursery and for the same purpose. The one was publicly, and the other privately nurtured through the years in which the United States grew to a vast and powerful nation—the 1870's to now.

Whether the veterinary service developing in the agricultural circle is something for the veterinary profession to quarrel with or to aid is purely a matter of which one is truly altruistic—noncommercial. Both may well weigh their sins in that respect. There are agricultural colleges which work wholeheartedly with the veterinary profession and others which would destroy it without compunction. Some of them (depending upon the *royalty* of their personnel), work closely with, and for the support of, the veterinary profession. Where that spirit prevails, the result is told in the animal-disease situation concerned.

The American veterinary educational system is no longer private. It is part of our government just as the agricultural colleges are. We, therefore, have the right as citizens to dictate the terms for their operation. As the politicians like to say, we, the taxpayers, have our ballot box. Organized veterinary medicine has the right to inquire on what grounds the people pay taxes to maintain a stated profession and other taxes to destroy it. So, if the country's enemies come in and take hold, it may be because the altruism which should correct such paradoxical situations was lacking.

Let us forthwith admit that the veterinarians of the United States, licensed to practice, are indebted for the knowledge of animals and their diseases to the agricultural colleges, especially for the researches of the veterinarians working therein. But, it is not easy to admit that any part of the knowledge imparted by agricultural colleges should be used to hinder the development of the kind of veterinary-medical service the veterinary profession has been conducting. Its achievements are great; its faults few.

Here we come to the difference between

the kind of veterinary service the two groups (agriculturists and veterinarians) advocate. Both have the same objective: the mastery of animal diseases. The agriculturalist (quoting from a speech we heard last month) is cocksure that with his research laboratory and contact with farmers, his state is in no danger from animal plagues. When disease breaks out, the college workers can step in and stamp it out, the speaker said. That kind of reasoning is bad for the country. Just who will do the reporting or just at what stage of trouble a farmer will call upon the college for help was not mentioned. Nor was anything said about who was going to do the stamping out and how. It may be quite late to start. Taking the set-up of the present time as the criterion, we see nothing whatsoever in the agriculturalist's personnel that is either sufficiently capable or numerous to "put out the fire." That is, taking the D. V. M's of the states and federal government out of the firing line, the agricultural college set-up would have to let the livestock industry "burn up" before its eyes, in the case of a dozen animal diseases one might name.

By contrast, there is the service of deployed technicians—the veterinary practitioners—who not only watch for plagues and promptly take steps to stamp them out or call on the state and federal governments for help, but who also look after the many other types of veterinary service the farmers need every day. The correspondence carried out with farmers by the agricultural colleges, or by their advisers at the county seat, is not much for bloated cows, colicky horses or herniated pigs nor for the scores of other ailments which bring college-trained practitioners to the farms where valuable animals are raised. The guardianship over plagues is but one of many services the veterinary profession has to offer. To overlook this part of the food-for-freedom program lacks foresight.

So, the moment is timely for both the veterinary profession and the agricultural colleges to come to an understanding as to just what their respective responsibilities are. Abolishing one or the other is as unthinkable as unwise. Yet, for the veterinary profession to start a campaign against the present set-up in state legislatures, Congress, and among the scientific and industrial societies would be no more unfair than the open and hidden attacks of the farm bureaus on the veterinary profession. The moment seems to be here for interjecting some common sense into the agricultural-veterinary hook-up in our country, in addition to weighing the harmfulness of the nostrum industry to general welfare.

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## Thirty Years of AVMA History

The status of the AVMA in 1912, when preparations were being made to celebrate its semicentennial anniversary in New York City, is revealed in the following editorial published in a widely circulated veterinary journal.[1]

> Unquestionably, it is of real importance that the American Veterinary Medical Association should have a permanent home of some kind—that it should no longer live in a trunk, being virtually a tenant-at-will, owning no property and paying no rent. An association of nearly 2,000 members, the largest in the world, should have permanent, official headquarters where its records can be kept in safety, where a library of valuable class literature can be collected and preserved, and where all members and all interested persons can at any time reach the officers of the Association on questions and matters of importance to the veterinary profession.

Unfortunately, the foregoing editorial rings true. In 1912, the AVMA had neither home, journal, nor library. It was just a national association functioning *ex officio* without opposition in a great livestock country. It was an unthrifty thing in a luxuriant pasture. It began publishing a journal in 1915 and established a permanent home in 1922—three years and ten years, respectively, after the foregoing editorial was written. The actual membership was not "nearly 2,000" for, in 1916, the paid up memberships were less than 900. Delinquent members not removed

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[1]Editorial, American Journal of Veterinary Medicine, viii (May, 1913), p. 269.

from the lists, reported at annual meetings, account for the big figures. An audit of membership in October, 1916, showed many members on the membership list who hadn't paid dues for more than 10 years, and those who owed dues from 1 to 10 years were legion.

In 1916, the entire property of the Association was a filing cabinet and its contents. It was a standard-size, oak filing cabinet which, in the middle section, contained a set of drawers holding the sum total of the Association's records of 53 years—the ledger running back no farther than from 1 to 7 years. The top and bottom sections contained unfiled, miscellaneous correspondence. Obviously, the records from 1863 to 1916 had not been passed from one secretary to the next. In short, past records are lost forever. For that 53-year period, there remained, and still remains, only the scattered reports of meetings published, *à volonté*, in journals over which the Association had no control.

In 1942, the Association has a fairly well equipped headquarters, a growing library of considerable importance, a membership of 7,500, publishes two journals having a circulation approaching 10,000, and carries out a public relations program designed to inform the public about the operations of veterinary science.

The growth and strength of the AVMA may be attributed to basic laws which give every member a voice in its management through the executive authority they (the members) delegate to the House of Representatives, the Executive Board, and the Board of Governors, every member of which is chosen in democratic fashion. It required 18 years, against considerable opposition, to get the present Constitution and Administrative By-Laws into operation because too few veterinarians can be aroused to take an active interest in such details.

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The average weight of the soldiers of the Civil War was 136 pounds, says *Science News Letter*, as compared with 156 pounds for those of World War II.

## What and Who Is a Parasitologist?

For the question contained in this headline, we are indebted to Dean Giltner who found considerable humor in the debate in the *American Journal of Public Health* over "Who and what is an epidemiologist?" *vide J.A.V.M.A.*, October and December issues. The other day, when the author of an article on certain legless invertebrates was asked to clarify a part of his text (one of those jigsaw puzzles called keys), we drew this acidic sarcasm: "Any parasitologist will understand that," meaning "how stupid you are."

But, where shall we go for the erudition? Does "any parasitologist" mean the practical guy who just moves the wormy lambs to the back pasture, the D.V.M. who can strafe Haemonchus with a deadly drench, the professor with long rows of bottled worms on the shelf, or the brow-knitting angler of eggs, oöcysts, scolices, "noodles," and other wigglings of metazoan creatures?

Consult a zoölogist? Heck, no! All things zooey are not parasites and *vice versa*. Or, are they? There is a lot of parasitism beyond the land of Vermes. Hall contended that parasitology is ill-defined and parasitologists are a rare genus, explaining that zoölogy, entomology, bacteriology, and even anthropology never assembled the harm-doers into a separated group of living specimens who poach upon one another's precinct's, not to mention that the vegetable phylum — from Bacterium sp. to Phoradendron sp.—is not included in veterinary-medical *wormology*, hence is beyond the ordinary ken of "any parasitologist." To a dumb editor, the notion that helminthology and parasitology are synonymous has always seemed just funny.

And, another thing—and this is important—articles are published for the single purpose of teaching the uninformed, not to show off before them. Most authors, thanks to them, keep that objective uppermost in mind, because they are teachers in fact, while a few regretfully, overlook the fact that clearness for all readers is a precious gift in writing. The good writer, like the good orator, knows his audience and strives to enlighten.

# CURRENT LITERATURE

## ABSTRACTS

### Johne's Disease in Sheep

A large percentage of sheep examined in Arkansas reacted to the johnin test and acid-fast bacilli were found in the intestinal mucosa of 15 out of 24 of reacting sheep. In some instances, acid-fast organisms were isolated in sheep which did not react. Interspecies transmission was considered but not shown. The infection is rare in pigs, although numerous reacting swine showed acid-fast organisms *post mortem*, distinguished from avian tuberculosis. Swine are probably carriers of Johne's diseases. [*Johne's Disease in Sheep, Abstr., E.S.R. lxxxvii (Nov. 1942), p. 716.*]

### War Medicine in the Red Army

A whole world is watching breathlessly the struggle of the Soviet people who seem to have shown a unity of effort and purpose which are hard to reconcile with the general conception of that country gained from newspaper opinions expressed in recent years. Only scientists have not been deceived, since much of value has been obtained from the work of their Russian colleagues. American military physicians have shown great interest in Soviet medicine, there being no doubt that the Soviet medical corps is an excellent one. It is said that despite the murderous battles, 70 per cent of all of the wounded have been restored to the fighting ranks. That achievement is attributed to the treatment of 60 per cent of the wounded right on the battle field, in lieu of the slow and uncertain evacuation to far away hospitals. Wounds from mines, hand grenades, and shells predominate over bullet wounds. Sulfa drugs play a major rôle in the treatment. Transplanting motor nerves is common practice in the hospitals, and Bogolmet's antireticular cystoxic serum developed at the Experimental Laboratory of Kiev has proved useful in the treatment of fractures and stepping up connective formation. The Institute of Biochemistry of Moscow has developed a substitute for vitamin K which is more active than the original product in the treatment of hemorrhages. Medical schools and scientific institutes were removed from German-occupied territory in time and are operating, and research is carried on vigorously. General Burdenko, one of the world's leading brain surgeons, has paid high tribute to American surgery and hopes for close coöperation of the medical corps of the two countries. The rôle of the blood bank, the Russian innovation of several years ago, adds materially to the low mortality among Russian soldiers. [*Sigerist, Dr. Henry E.: War Medicine in the Red Army, Soviet Russia Today, Nov. 1942, pp. 17 and 37.*]

### Atabrine, Quinine Succedaneum

The most prevalent disease afflicting the populations of the world is undoubtedly malaria. How many cases occur each year is not known, but estimates place the number as high as 800,000,000. In the United States, sanitary engineering projects have had some influence in lowering the incidence of the disease, but the effect on a world wide basis is negligible. The importance of quinine had, therefore, not been materially diminished when the main sources of that antimalarial drug fell into the hands of the Japanese. Happily, American chemists solved the problem of synthesizing Atabrine (=quinacrine) which, previously, was prepared from imported intermediates. Extensive clinical investigations carried out by the National Research Council in leading institutions throughout the country have removed all doubt as to the merits of the substitution. [*Editorial: American Atabrine, J. A. M. A., cxx (Nov. 14, 1942), p. 842.*]

### Single-Dose Rabies Vaccine

A potent, nonvirulent rabies vaccine was prepared by ultraviolet irradiation of the supernatant fluid obtained by triturating, diluting, and centrifuging infected dog brain. The irradiation destroyed the virulence of the rabies virus, but not its immunizing power.

Using a 1 per cent supernatant dog brain virus to prepare the vaccine, the authors found that 25 to 30 cc. of this vaccine immunized young beagle dogs to fixed or street virus which was fatal to all the control dogs. When the vaccine was concentrated by using a 5 per cent supernatant dog brain virus, it was found that 5 cc. of this concentrated vaccine protected highly susceptible dogs against rabies.

Comparison of these new vaccines with

phenolized and chloroformized vaccines showed the following: of 141 control dogs, 92.2 per cent died; of 53 dogs given commercial phenolized vaccine, 77.3 per cent died; of 50 dogs given commercial chloroformized vaccine, 46.0 per cent died; of 38 dogs given 20 to 40 cc. of irradiated vaccine intraperitoneally, 13.1 per cent died; of 31 dogs given 5 to 10 cc. of concentrated irradiated vaccine intraperitoneally, 0.3 per cent died.

A conclusion is reached that a comparison between subcutaneous and intraperitoneal administration of rabies vaccine shows little difference, but that the intraperitoneal route is slightly preferable. [*Webster, L. T. and Casals, J.: A Non-Virulent, Single-Dose Rabies Vaccine for Prophylactic Immunization of Dogs, J. Exp. Med., (August, 1942), p. 185.*]

## Avitaminosis-A Pathology in Calves

Insufficient vitamin A in calves might show a variety of symptoms now associated with disease, one of which is constriction of the optic foramen resulting in pressure on the optic nerve. This phase of avitaminosis A primarily involves osseous tissue, which is further aggravated with increased cerebrospinal pressure, nyctalopia, papilledema and permanent blindness. It may also cause degeneration of testicular epithelium and absence of spermatozoa. Thorp, *et al.* (1942) describe enteritis diarrhea and renal and hepatic lesions in severe deficiencies of this vitamin. They describe the intestinal lesions as hyperplastic enteritis with considerable necrosis and desquamation, edematous mesenteric lymph nodes, cloudy swelling, necrosis and fatty degeneration of the liver. The ocular phase of avitaminosis A needs further study. The importance of these findings is that deficiency of vitamin A is not limited to epithelium. Many organs and structures are affected. [*Editorial: Avitaminosis-A Pathology in Dairy Calves, Nutrition Reviews, i (Nov. 1942), pp. 17-18.*]

## Streptococci and Encephalitic Virus

During studies of the epidemic of encephalitis in North Dakota and Minnesota in 1941, a neurotropic type of streptococcus was isolated from 55 emulsions made from the brains of persons, horses, sheep, a hog, a dog, a mink, a bat, chickens, wild ducks, a goose, a pheasant, and a fish that had succumbed to encephalitis. The streptococcus was also obtained from mosquitoes, flies, indoor and outdoor air, dust from air-conditioning filters, water from first rains, lakes, rivers, streams, and soil from the bottom of a lake where deep-feeding ducks were dying. Inoculation of 39 specimens from these latter sources into guinea pigs and mice resulted in encephalitis in 53 per cent of the guinea pigs and 40 per cent of the mice. Experiments were then performed to test the validity of the suggestion that the strepococcus was an inciting agent of the epidemic and was air borne.

The virus was found in the brains of animals that had died of encephalitis after inoculation of emulsions of the brains of animals that had died following the injection of virus derived from streptococcus. This virus produced encephalitis consistently in guinea pigs and mice in from three to seven or more passages.

To determine whether the streptococcus would invade the brains of animals caused to breathe, and perhaps swallow, the streptococcus, and if so, whether the virus could be produced in this way, pure cultures of streptococcus were nebulized into the air of cages in which mice were kept and added to running water in which fish were kept. Lesions of encephalitis occurred in some of the cases, and the incidence of encephalitis in fish, mice, and guinea pigs used for serial passage of infective emulsions of the brains of those mice and fish which were exposed to the streptococcus was highly significant.

The author concludes that these experiments indicate (1) that the streptococcus is a source of what is now considered virus, (2) that the virus represents the filtrable phase of the streptococcus, and (3) that the spread of the streptococcus by air was a major factor in causing encephalitis to occur in epidemic proportion over such a vast area in 1941. It is suggested that any material, wherever found, that contains the encephalitic type of streptococcus may be a "reservoir" of virus.

[*Rosenow, E. C.: The Relation of Neurotropic Streptococci to Encephalitis and Encephalitic Virus". Proc. Staff Meet. Mayo Clinic, xvii (Nov. 4, 1942), p. 551.*]

## Transmission of Swamp Fever by Stable Flies

Two susceptible horses developed infectious anemia 10 to 12 days after having been bitten with *Tabanus sulcifrons* and another horse 24 days after being bitten. Infections can be induced by repeated pricking with a hypodermic needle contaminated with the virus or by subcutaneous injection of 1 cc. of virus diluted to 1:1,000. Swamp fever virus was isolated in the mouth parts of flies that had fed on infected horses. [*Stein, C. D., Lotze, J. D., and Mott, L. O.: Transmission of Equine Infectious Anemia by the Stablefly (Stomoxys calcitrans) and the Horsefly (Tabanus sulcifrons, Marquart) and by Injection of Minute Amounts of Virus, American Journal of Veterinary Research, iii (July, 1942), pp. 183-193.*]

## Hygiéne du Lait sur la Ferme* (Milk Hygiene on the Farm)

Hygiene and medicine are two of the branches of biological science having the conservation of health as their ends: medicine through the treatment of diseases, and hygiene through their prevention and the amelioration of the organism. Hygiene concerns the ground upon which we live, the air we breathe, and the food we eat. Among the latter, milk plays a primordial rôle in both animal and human life, and is, therefore, an important subject to expound. Milk inspection is a precious auxiliary to public health; it prescribes the farm conditions required for the production of milk of the first quality. Being a good culture medium for microbes, milk is an excellent vehicle for such diseases as tuberculosis, diphtheria, sore throat, etc.; it follows that all cows, all producers, and all handlers should be in good health. Bovine tuberculosis is well under government control, but it will require considerable propaganda to convince the farmers about brucellosis and streptococcal mastitis, notwithstanding that veterinarians are making some progress from year to year in these connections.

The milk-producing animal must receive proper care and nourishment: wholesome feed, balanced rations, fresh water, amplitude of feed, regular feeding in clean mangers—cleaned after each meal, supervision of wells and springs against contamination. Cleanliness of the cows' bodies, clipping in the fall, daily grooming, ample ventilation, and comfortable litter renewed every day are necessities in the production of good, sanitary milk.

For the rigorous climate (Quebec), the King or Vessot system of ventilation is required to assure sufficient exchange of air and minimum loss of heat. Disinfection and whitewashing after each fly season, when cows are brought in for the winter, should not be omitted, nor should the drainage of the yard and hygienic disposal of manure be neglected.

While all of these points are of great importance, the most essential feature of sanitary-milk production is to exempt a too high bacterial count. This involves the washing of the udder and flanks with disinfectants, rejecting the first jets, washing the hands, remembering that the milk stool is the last thing handled before starting to milk. These should be kept painted and cleaned.

After milking each cow, the milk is carried and poured, sheltered from flies, bad odors, dust and from all sources of contamination. The milker should convince himself that the milk he takes from the udder is immaculate, and if soiled or contaminated that it was his fault.

Milk utensils should be used for milk only. They should be without flaw; rinsed in cold water after use; sterilized with disinfectants, boiling water, or steam; and kept on appropriate racks. The milkhouse is used exclusively for the chilling of milk and storing of the milking utensils. It should be located at least 20 feet from the stable, 100 feet from the pig sty, chicken coop, outdoor toilet, and manure pile.

Milk should be refrigerated to 45 F. within 30 minutes after milking by immersing the milk cans in cement troughs containing water and cracked ice, or mechanically refrigerated. In fact, the secret of sanitary-milk production lies in (1) cleanliness, (2) rapid refrigeration, and (3) maintaining a low temperature.

This, in a word, signalizes the work of a milk inspector. He should be regularly registered as a *médecin-vétérinaire* by the College of Veterinary Medicine, Province of Quebec.

The good milk inspector possesses tact and good judgment. He is polite, courteous, firm in his decisions, well clothed, clean shaved, abstains from the use of alcoholic beverages, and obeys the regulations under which he labors. *Je me soumets*, is the spirit that has brought credit to certain milk inspectors of Montreal. [*Paquin, Jean: Hygiéne de lait sur la ferme, Canadian Journal of Comparative Medicine, vi (Sept. 1942), pp. 255-258.*]

*Presented before the *Société Vétérinaire de la Province de Quebec*, March 31, 1942.

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## Debarking Dogs

Devocalization was carried out on 20 dogs under morphine-ether anesthesia by use of a pair of Miles nasal cutting forceps. After about three months, each dog developed a hoarse, unpleasant bark, and the assumption was that the operative technique had been faulty. However, later autopsy showed that the true vocal cords were completely gone, but revealed in each case a well developed pair of soft mucous folds or pockets at the base of the epiglottis. These were identified as false vocal cords and seemed to be the only remaining structures by the use of which sound might be made.

Surgery was again resorted to, and the soft folds were removed as completely as possible with a pair of straight, back-cutting Ostrom forceps. Due to the soft, stringy nature of the tissue in these cords, the cutting is more difficult and the bleeding is more profuse than with the true cords.

Approximately 200 dogs have been devocalized by this simultaneous method, and animals living eight and nine years after the operation have had no return of vocal powers. The author notes that the dogs seem to derive as much pleasure from the resultant whisper as from the noisy bark. [*Donnelly, G. L.: "Permanent Devocalization of Dogs by Removal of both the True and the False Vocal Cords," Proc. Soc. Exp. Biol. Med., 1 (May, 1942), p. 79.*]

# BOOK NOTICES

## Medical Manual of Chemical Warfare

This is a book of 106 pages with three appendixes of 26 well-illustrated pages depicting the damage inflicted by the war gases used in World War I. There are nine chapters cover-

Fig. 1.—Mustard-gas burn from wearing a contaminated glove for three hours. Photograph taken 24 hours after wear.

ing 99 separate subjects abridged for practical edification. The titles are:

I) General Description of War Gases
II) Vesicant or "Blister" gases
III) Lung Irritant or "Choking" Gases
IV) Paralysant Gases
V) Arseniurated Hydrogen Poisoning
VI Gases Used Primarily as Harassing Agents
VII) Danagerous Gases Not Used for Offensive Purposes But Which May Be Used Under War Conditions
VIII) Protection Against Gas and Air-Raids
IX) The Recognition and First Aid Treatment of Gas Casualties

The appendixes are titled (1) Summary of Gases, Properties, Methods of Recognition and First Aid Treatment; (2) Administration of Oxygen; and (3) An Atlas of Gas Poisoning.

The author's object is to present a brief résumé of the subject for the use of medical officers and to emphasize the importance of

Fig. 2.—Erythema from exposure to mustard-gas vapor. Drawing made on fifth day after exposure (at Ypres, July 12, 1917).

recognizing promptly the type of gas poisoning to which the victim was exposed. The book is a short, practical treatment of a subject no soldier or civilian should be overlooking. An insight to the character of this manual is shown in the illustrations herewith reproduced. The veterinarians of Meuse-Argonne experience

will recall the terrors of mustard gas among the transport animals of the First Army, A.E.F., which had to operate on gassed terrain. [*Medical Manual of Chemical Warfare, Revised Edition, reprinted by permission of the controller of his Britannic Majesty's Stationery Office. Chemical Publishing Company, Inc., Brooklyn, N. Y.*]

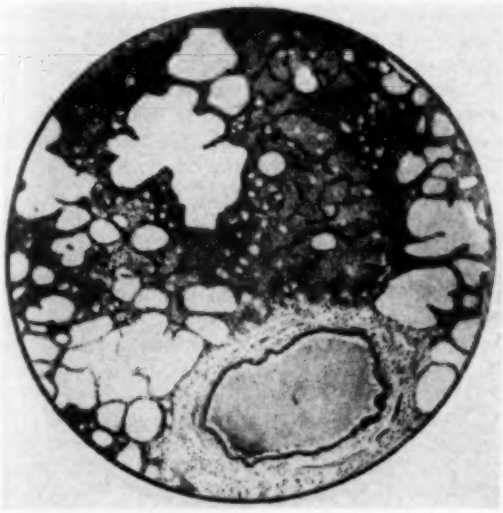

Fig. 4.—Photomicrograph of a section of the human lung after exposure to phosgene gas.

## Los Angeles County Livestock Department Eighteenth Annual Report

Los Angeles County in military regalia is a "neck of the woods" transformed beyond resemblance of its former self. From the peaceful atmosphere of stately palms, orange groves, dairy farms, swanky towns, and inviting highways galore, there has come the ear-cracking din of a global war: soldiers, sailors, marines, mechanics, trucks and trains, factories and cantonments, training centers and oversea shipping of endless file and undreamed bustle springing like mushrooms in every nook. Muddy flats, grain fields, and truck farms are turning out bombs and bombers, tanks and fighter planes, arms and ammunition to the tune of the riveting hammers and welding tools. Precision and efficiency reign.

Yet agriculture, as never before, is helping the county, the state, and the nation to carry out the tremendous undertaking of protecting our country against the unprecedented savagery that has overtaken a peaceful world. The goals set by the Secretary of Agriculture in the production of fruits, vegetables, farm crops, and animal products are being fulfilled. Poultry and dairy ranches are keyed up to yield increased qualities of their vital foodstuffs despite the transformation and the coming and going of the countless uniformed legions which have made southern California a war center of unmeasureable magnitude. Witness: Butter production was the highest in the county's history; the area has been praised for its high egg production; dairy and poultry production reached an alltime high.

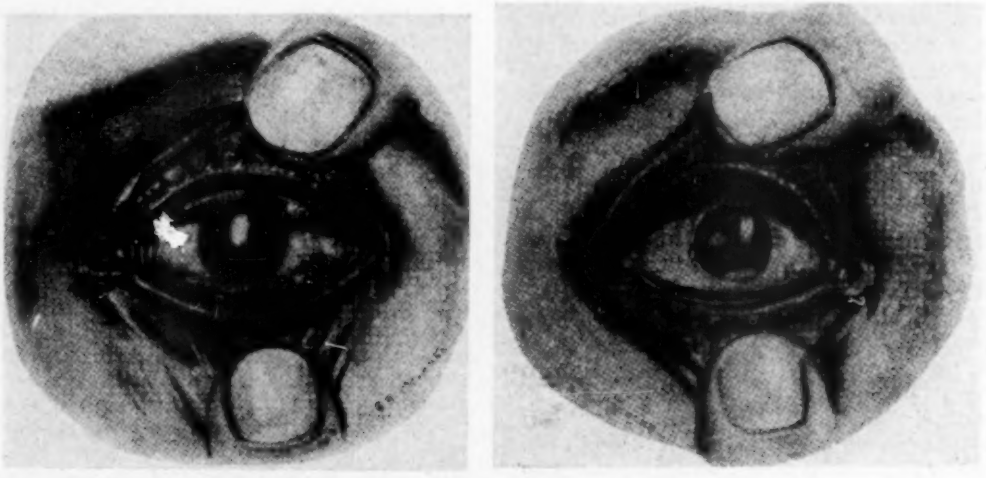

Fig. 3.—Showing two stages of mustard-gas conjunctivitis. The picture to the left shows general conjunctivitis and caustic effect on the interpalpebral aperture. The right picture shows the gray, lusterless cornea of the exposed area.

Realizing its duties, the Live Stock Department has not only geared up its operations but has made surveys for stepping up coöperation with state and federal agencies in regard to the handling of ship garbage, horse supply, supervising the transfer of farming from the Japanese, protecting sheep against predatory animals, providing shelter and care of animals exposed to air raids, and regulating the breeding and usage of homing pigeons. These represent efforts in addition to those of peacetime routine.

State Veterinarian Duckworth has again confirmed Los Angeles County a modified accredited area for bovine tuberculosis. In this respect, the county protects itself against the importation of tuberculous cattle in addition to the protection afforded by the state and federal authorities. The added precaution is deemed essential in view of the county's large dairy cattle importations, of which there were 38,022 in 1942: 21,058 intrastate and 12,585 interstate, dispersed among 2,947 herds. The reactors found numbered 0.117 per cent.

To be remembered is that southern California must protect its cattle against Texas fever ticks, owing (in one instance related) to unregulated local sales at the source. Protective measures were instituted, mainly the use of arsenical sprays, in the absence of available dipping vats. This entailed the inspection of 29,511 cattle and the quarantine of 37 premises, all but two of which were released during the year.

The report covers activities in poisonous plants, rabies, calf diphtheria, blackleg, hemoglobinuria, "hardware disease," paratyphoid, parasites, mastitis, horse-meat traffic, racetracks, dourine, equine encephalitis, diseases of sheep and goats, swine diseases, vesicular exanthema of hogs, anthrax, poultry diseases, rabbit diseases, and brucellosis.

The annual report of the Los Angeles County Live Stock Department, of which L. M. Hurt, live stock inspector, is the author, is the newsiest and most revealing book of the kind that comes to the files of the AVMA library. Besides the statistical records and technical material contained, it represents a pattern of veterinary service for metropolitan centers that would materially change American history were it universally instituted throughout the country. [*Los Angeles County Department, Annual Report for the Fiscal Year ending June 1942. Board of Supervisors, Roger Jessup, Chairman. Edited by L. M. Hurt, D.V.M., B.S., Live Stock Inspector. 63 pages, 10 ½ x 8".*]

## Diseases of Cattle

As of July 1, 1941, the Congress appropriated $30,000 for the publication of 35,000 copies of *Special Report on Diseases of Cattle* "to be revised and brought up to date." Of these, 26,200 are for use of the House of Representatives and 8,800 for the Senate. Revision was assigned to Chief John R. Mohler of the Bureau of Animal Industry, who in turn delegated members of his staff to revise the various chapters which this familiar book contains.

The original edition was written by A. J. Murray, V. T. Atkinson, W. H. Harbaugh, William Herbert Lowe, James Law, M. R. Trumbower, John R. Mohler, and B. H. Ransom. Of the eight authors, the last two were of the Bureau staff, the others, as was customary at the time, were drawn upon from private life to accomplish the task of writing a book suitable for popular edification of the cattle-breeding industry on diseases affecting their enterprise. While the early editions stressed the importance of teaching farmers how to handle diseases of their cattle to the same extent as knowing how to use a saw and hammer, the foreword of the 1942 edition emphasizes that "stockmen can do much to protect the health of their animals along preventive lines, especially by their proper feeding, care, and management." This transformation is a lesson in veterinary progress, an indication that, meanwhile, a profession of animal medicine has developed and taken over the treatment of disease beyond the scope of first aid treatment. Nothing more truly depicts the efforts made by the federal government to master diseases of farm animals than these books written for the general information of farmers, while a veterinary educational system and profession were yet to loom on the horizon of American development.

This book retains the original nineteen chapters, each of which is "brought up to date" as the Congress directed, by members of the Bureau staff: Giltner, Stein, Huffman, Shahan, Mohler, Cotton (W. E.), Miller, Dale, Mohler (W. M.), Creech, and Dikmans. A careful search through the revision reveals few flaws or omissions in the task the revisers assayed. In fact, the contrast between the original edition and that of 1942 reveals the progress made in bovine pathology in recent years—40 years. The chapter on dystocias is perhaps as good technics as one can put into words for the guidance of the good neighbor brought in to straighten out a recalcitrant fetus, but whether the modern bovine obstetrician would obey the rules set down is another matter. Epidural anesthesia, modern embryotomy, and cesarean section are obviously not intended for the farmer to undertake. Everything, however, is set right by the reviser's sound advice on the

handling of retained afterbirth which, needless to say, is generally a mishandled puerperal accident.

The 133 pages on infectious diseases of cattle by John R. Mohler, contains the modern, boiled down facts on the main infections of the bovine species, domestic and exotic, which all veterinarians will be delighted to read in these days of guarding a large proportion of the nation's food supply against the ravages of its many microbic enemies. These are well-illustrated pages on contagious pleuropneumonia, nagana (teste-fly disease), rinderpest, foot-and-mouth disease, cattle farcy of the West Indies, hemorrhagic septicemia, coital exanthema, rabies, pseudorabies (mad itch), tuberculosis, Johne's disease, variola, actinomycosis and actinobacillosis, anthrax, blackleg, calf diphtheria, mycotic stomatitis, vesicular stomatitis, malignant edema, tick (Texas) fever, and anaplasmosis. Brucellosis, calf scours, and pink eye (infectious catarrhal conjunctivitis) are treated in other chapters.

Ransom's chapter titled "Parasites of Cattle" revised by Gerald Dikmans brings down to date the newer knowledge on the screwworm and stomach-worm plagues, coccidiosis, and distomiasis. [*Diseases of Cattle, Revised Edition, 1942, prepared by Dr. John R. Mohler, chief of the Bureau of Animal Industry, United States Department of Agriculture. 506 pages, many illustrations, and color plates. United States Government Printing Office, Washington, D. C. Price* $1.75.*]

*Inasmuch as 35,000 copies are "for use of the House of Representatives and the Senate," copies can no doubt be obtained from one's Representative or Senator free of charge.

## Diseases of the Horse

*Diseases of the Horse*, Revised Edition, 1942, is an attempt to rejuvenate the equine pathology of the nineteenth century—of Leonard Pearson, Rush Shippen Huidekoper, C. B. Michener, W. H. Herbaugh, James Law, M. R. Trumblower, Alexander Liautard, A. A. Holcombe, and John W. Adams, tycoons of the adolescent period of veterinary medicine—literati of other days—brought in nearly 50 years ago from private life by the USDA to paint the picture of horse medicine for the edification of the American people. That these well-known figures wrote the best book ever written on that subject (for the purpose intended) was never challenged. The authors of the first edition (1896) "prepared under the direction of D. E. Salmon" were Michener, Law, Harbaugh, Trumbower, Liautard, Holcombe, Huidekoper, and Dickson. In later editions, the latter was replaced by John W. Adams as the author of the chapter on horseshoeing. Otherwise, the authorship during the next four and a half decades remained much the same, except that Chief Melvin and then Chief Mohler prepared the editions. Compared with the old editions, the chapters of the one for 1942 are revised by scientists regularly employed by the Department: Bunyea, Mohler, Creech, Shahan, Gochenour, and Giltner, who undertook the travail of "painting the rose" with the new colors which the advance of veterinary-medical science brought into the landscape. One can sympathize with authors of 1942 who attempt to revise the general principles of veterinary practice laid down by Law, Liautard, and Huidekoper, or the horseshoeing of John W. Adams, as much as one can compliment them for honoring the old authors by retaining their names and their methods of approach to the subjects contained, without sacrificing modern knowledge. One may, however, be pardoned for suggesting more revision of wound treatment, wound diseases, and wound classification, together with such revolutionary innovations as the modern biological and chemical therapeutics of traumatic injury. Advising farmers on the treatment of punctured wounds, nail punctures of the feet, and gunshot wounds without mention of tetanus toxoid and tetanus antitoxin and the local and internal use of the sulfonamide drugs is an unclosed gap in the text of this book—obviously an oversight. Notwithstanding this and a few other slips, here and there, *Diseases of the Horse* for 1942 has to be pronounced a precious, historical masterpiece, nearly 50 years old, that is brought down to date with honor and respect for the original authors, by distinguished veterinarians of the United States Bureau of Animal Industry. The book contains 42 plates, some of them in color, which no modern artist could possibly improve. [*Diseases of the Horse, Revised Edition, 1942, prepared by Dr. John R. Mohler, chief of the Bureau of Animal Industry, United States Department of Agriculture, 584 pages, and many illustrations. United States Government Printing Office, Washington, D. C. Price* $1.75.*]

*Inasmuch as 20,000 copies are "for the use of" the Congress, copies can no doubt be obtained from one's Representative or Senator free of charge.

In the 1920's we received an ordinary piece of first class mail from Germany upon which there was more than a billion marks in postage stamps. "It can't happen here" is the rumor afloat, just as some folks said about the war last year. The remedy is buying Defense Stamps and Bonds, buying 'til it hurts as a preventive of more painful times ahead.

# THE NEWS

## *AVMA*

### Board of Governors and Executive Board Meet in Chicago

The regular mid-winter meeting of the Board of Governors was held at the LaSalle Hotel, Chicago, on Dec. 1, 1942. On December 2, the Board met with other members of the Executive Board who were in Chicago to attend various meetings during the week. Present were O. V. Brumley, *board chairman*, President W. W. Dimock, and *president-elect* C. W. Bower (Board of Governors); and Executive Board members J. L. Axby, W. E. Cotton, W. A. Hagan, C. C. Hastings, Ashe Lockhart, and F. M. Wilson. President Dimock appointed J. R. Beach to attend the meeting as representative from District VI. Treasurer M. Jacob was also present, and J. G. Hardenbergh, *executive secretary*. Various items of association business were transacted, including arrangement of the schedule of state veterinary meetings and conferences to be attended by association officers during the next several weeks.

President Dimock, as usually happens to AVMA presidents in January, has a very arduous schedule on account of the large number of meetings to which he has been invited this year; the list includes the University of Pennsylvania Conference for Veterinarians, January 5-6; Cornell Veterinary Conference, January 6-8; Indiana State Veterinary Medical Association, January 12-14; Tennessee, January 18-19; Mississippi, January 21-22; North Carolina Conference for Veterinarians, January 26-29. (Since the schedule was arranged, several meetings have been canceled, due to wartime travel restrictions.)

President-elect Bower is to attend the meeting of the California State Veterinary Association at San Luis Obispo, January 4-5, the Intermountain Livestock Sanitary Association at Salt Lake City, January 6,7 (if held), and the Michigan State Post-Graduate Conference for Veterinarians, East Lansing, January 25-29.

Final decision about holding the regular annual meeting, scheduled for St. Louis in 1943, was deferred until about February 1. It was agreed that, if the regular session is cancelled, the necessary business session of the Executive Board and House of Representatives would be held in Chicago. It was also decided to defer action on the 1944 meeting, invitation for which was received from Dallas, Texas.

The Board of Governors (committee on the JOURNAL) approved the establishment of a section on nutrition for the JOURNAL, the material for which is to be furnished by the standing committee on nutrition.

Several articles on the control of livestock diseases which are of particular wartime importance are under preparation by special and standing association committees. The publication and reprinting of these special reports were approved as a timely contribution to the increased livestock production program.

The appointment of a special committee to study the trichinosis situation, as recommended by the section on sanitary science and food hygiene, was decided against and the problem referred to the special committee on food hygiene.

Careful study was given the mileage rationing program as it affects veterinarians. Reports were made by board members which indicated that any pronounced effort to obtain over-all preference for veterinarians would be ill-advised at this time, in view of the critical rubber situation. (*See* the statement from OPA in "The Veterinary Profession and the War" section of this issue.)

The Boards transacted numerous other items of association business during the two afternoons in which they were in session.

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### Joint Food Committee Meets —New Seal Issued

The semiannual meeting of the Joint Committee on Foods was held at the Palmer House in Chicago, Nov. 30, 1942.

The manufacturers of approved foods were invited to attend for a discussion of the serious ingredient problem now facing the producers of all types of animal feeds. These producers expressed their willingness to cöoperate in every way possible to keep supplies of at least one approved food available in every territory of the United States, so that pet owners will be able to obtain these foods for the nourishment of their animals.

The Committee approved the preparation of

a circular to all AVMA members calling attention to conditions resulting from the war that directly affect millions of animal owners and veterinarians. This will be mailed in the near future.

The Committee recommended to the Board of Governors that steps be taken to develop methods for the chemical and biological testing of horse feeds. At present little is known regarding the specific nutritive requirements of the horse and mule.

The executive secretary of the Committee was instructed to conduct a survey to ascertain the feasibility of consolidating more of the chemical and biological testing work under the direct supervision of the Joint Committee on Foods. The results of this survey are to be presented at the annual meeting in June.

One additional product was granted the seal of approval:

**Vitality Brand Dog Food**—manufactured by Vitality Mills, Board of Trade Bldg., Chicago, Ill.

Other tested and approved products as of Jan. 1, 1943 are:

**Friskies**—(Dry)—manufactured by Carnation Albers Company, Seattle, Wash., and Milwaukee, Wis.

**Gro Pup**—(Dry)—manufactured by W. K. Kellogg Company, Battle Creek, Mich., and London, Ont., Canada.

**Insurance Dog Food**—(Dry)—manufactured by Ballard and Ballard, Louisville, Ky.

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**Research Council Meets in Chicago.**—The annual meeting of the AVMA Research Council was held at the LaSalle Hotel, Chicago, on Tuesday evening, Dec. 1, 1942. Members present included E. T. Hallman, *chairman*, H. H. Dukes, *secretary*, C. A. Brandly, W. E. Cotton, M. A. Emmerson, G. H. Hart, and M. L. Morris.

Applications for veterinary research fellowships were presented and the operation of fellowships under wartime conditions discussed.

Election of officers for the ensuing year resulted in the re-election of E. T. Hallman, as *chairman*, R. A. Kelser, *vice-chairman*, and H. H. Dukes, *secretary*.

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## Can You Help Locate These Lost Members?

The aid of JOURNAL readers is solicited in locating the following members, mail to whom has been returned to the Association's central office. The last known address of each is given. Should you be able to provide information as to present residence, your advice via postcard or letter will be greatly appreciated.

Allen, G. H., Northwest Poultry and Dairy Products Co.

Antroinen, Aaron P., Central Apts.—Apt. 10, Crookston, Minn.

Bartley, Frank E., Westboro, Mo.

Beauchamp, John W., Bellingham Hotel, Bellingham, Wash.

Case, R. W., 1534 W. McDowell, Phoenix, Ariz.

Castro, Fred, Gen'l. Del., Omaha, Neb.

Clymer, Elza E., 107½ W. Washington St., Napoleon, Ohio

Collins, Wayne D., 4th E. A., Fort Bragg, N. Car.

Cox, Wm. L., Box 2074, Raleigh, N. Car.

DeMott, Andre R., Utica St., DeRuyter, N. Y.

Dodd, Daniel P., c/o Jackson County Animal Hosp., 123 E. Lexington, Independence, Mo.

Faulk, A. L., 106th Med. Reg.—31st Div., G.P.O. No. 31, Camp Blanding, Fla.

Feinberg, Sidney, 88 Charles St., Boston, Mass.

Finney, Lawrence, Georgetown, Ill.

Hantman, Harris W., Station Hosp., Grenier Field, Manchester, N. H.

Haynie, Fred B., 230 W. 1st, N., Richfield, Utah

Helmbodt, Charles F., Box 59, Unionville, Mich.

Hergren, Douglas R., 830 Shawano Ave., Green Bay, Wis.

Holtzman, Jacob, Station Hosp., Army Air Base, Fort Douglas, Utah

Keane, John J., Fort Adams, R. I.

Lamkin, William E., Patroit, Ind.

McCamish, John N., c/o Skyland Grocery, Ruidoso, N. Mex.

Mathis, Rudy C., State Veterinarian, Atlanta, Ga.

Mesenbrink, R. L., Gen'l. Del., Kirksville, Mo.

Moffat, Geo. Calvin, 5732 W. Cermak Rd., Cicero, Ill.

Olson, Philip C., 914 W. Walnut St., Yakima, Wash.

Remsberg, Glen S., Chicago Q.M.C. Depot, 1819 W. Pershing Rd., Chicago, Ill.

Rodgers, Robert J., c/o Gen'l. Del., Laredo, Texas

Sadow, I. J., Ft. Benning, Ga.

Spears, C. J., Dublin, Ga.

Thompson, L. G., Swainsboro, Ga.

Ucko, Peter W., 22 Grand Ave., Plainfield, N. J.

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## What the Newspapers Say

*Harling (Tex.) Farming and Citiculture* (Oct. 31, 1942)

Adult mortality [of poultry] is still a very serious problem and is likely to increase with the present expanded poultry population. Much of this adult mortality is avoidable. Sound programs for the reduction of mortality, such as that advocated by the American Veterinary Medical Association, should be adopted.

*Newport (Tenn.) Tribune*
(Nov. 9, 1942)

Tennessee veterinarians lead all other professional groups in volunteering for war service, reported Dr. M. Jacob, dean of the University of Tennessee College of Agriculture and chairman of the Tennessee State Veterinary Preparedness Committee.

According to official word from Washington, more than 95 per cent of the veterinarians in the United States have already enrolled with the War Manpower Commission.

## APPLICATIONS

***The listing of applicants conforms to the requirements of the administrative by-laws — Article X, Section 2.***

### First Listing

BLISS, C. A.
Osborne, Kansas.
M.D.C., Chicago Veterinary College, 1910.
Vouchers: S. L. Stewart and Ashe Lockhart.

BROWN, C. W.
P. O. Box 443, Edinburg, Texas.
D.V.M., Iowa State College, 1910.
Vouchers: H. L. Darby and L. R. Noyes.

CALLAHAN, F. H.
Box 221, 317 N. E. 11th St., Abilene, Kansas.
D.V.M., Kansas State College, 1929.
Vouchers: F. B. Croll and Ashe Lockhart.

CAVANAUGH, E. C.
200 Horner St., Johnstown, Pa.
V.M.D., University of Pennsylvania, 1914.
Vouchers: Otto Stader and C. P. Bishop.

CHESHIRE, J. B.
210 W. 3rd St., Maryville, Mo.
D.V.M., Kansas State College, 1931.
Vouchers: G. L. Dunlap and Ashe Lockhart.

CRENSHAU, E. R.
P. O. Box 274, Garland, Texas.
D.V.M., Southwestern, 1916.
Vouchers: T. O. Booth and Ashe Lockhart.

DUNBAR, L. A.
2733 Saltillo St., San Antonio, Texas.
D.V.M., St. Joseph Veterinary College, 1920.
Vouchers: T. O. Booth and Ashe Lockhart.

GILILLAND, W. J.
Hereford, Texas.
D.V.M., Texas A. & M. College, 1939.
Vouchers: T. O. Booth and Ashe Lockhart.

GRANDFIELD, L. G.
1921 E. Douglas, Wichita, Kansas.
D.V.M., Kansas State College, 1923.
Vouchers: F. B. Croll and Ashe Lockhart.

GRAY, HARRY P.
2050 Kings, Springfield, Mo.
D.V.S., Western Veterinary College, 1905.
Vouchers: Ashe Lockhart and J. L. Wells.

HANNEMANN, WALTER H.
1504 N. 24th St., Kansas City, Kansas.
D.V.M., Kansas City Veterinary College, 1918.
Vouchers: S. L. Stewart and Ashe Lockhart.

HAYNIE, E. H.
8343 Wornall Rd., Kansas City, Mo.
D.V.M., St. Joseph Veterinary College, 1918.
Vouchers: G. L. Dunlap and Ashe Lockhart.

HOEDT, W. H.
432 Larchwood Ave., Bywood Upper Darby, Pa.
V.M.D., University of Pennsylvania, 1909.
Vouchers: F. E. Lentz and E. J. Van Tilborg.

HOWARD, J. E.
862 McNichols Rd., W., Detroit, Mich.
B.V.Sc., Ontario Veterinary College, 1927.
Vouchers: C. M. Hamilton and S. R. Elko.

INDORF, JOHN H.
St. Francis, Kansas.
D.V.S., St. Joseph Veterinary College, 1911.
Vouchers: C. W. Bower and Ashe Lockhart.

JOHNSON, H. S.
119 Federal St., N. S. Pittsburgh, Pa.
D.V.M., Ohio State University, 1915.
Vouchers: L. D. Barrett and C. W. Frush.

KRAFT, IRENE
789 N. Broadway, White Plains, N. Y.
M.R.C.V.S., Royal Veterinary College, London, 1939.
Vouchers: C. E. DeCamp and W. E. Ulmer.

MCGILVRAY, JOHN H.
Minnesota Avenue at 34th St., Sioux Falls, S. Dak.
D.V.M., Iowa State College, 1942.
Vouchers: L. L. Dunn and D. L. Cotton.

MCKEE, GRADON S.
R.D. No. 3, Washington, Pa.
D.V.M., Ohio State University, 1933.
Vouchers: J. H. Adams and W. M. Markle.

MAIER, M. E.
901—10th St., Orange, Texas.
D.V.S., Kansas City Veterinary College, 1911.
Vouchers: T. O. Booth and Ashe Lockhart.

MILLER, E. V.
Bolivar, Mo.
D.V.M., Kansas City Veterinary College, 1917.
Vouchers: Ashe Lockhart and G. L. Dunlap.

NAYLOR, J. RICHARD
8000 E. Colfax Ave., Denver, Colo.
D.V.M., Colorado State College, 1932.
Vouchers: C. L. Davis and T. E. Traylor.

N. C., Jan. 26-29, 1943. D. C. Grinnells, State College Station, Raleigh, N. C., program chairman.

PUTERBAUGH, A. R.
R.R. No. 5, Box 144, New Castle, Ind.
D.V.M., Iowa State College, 1940.
Vouchers: J. J. Arnold and C. W. Fisher.

SHEPARD, HARRY
Box 524, Kerrville, Texas.
D.V.M., Southwestern, 1916.
Vouchers: U. E. Marney and W. A. Curtis.

STRONG, WARREN M.
Defiance, Ohio.
D.V.M., Michigan State College, 1940.
Vouchers: A. Kottenbrock and A. Busser.

TUTT, J. F. D.
"Rothiemurchus," St. Cross, Winchester, Hants, England.
F.R.C.V.S., Royal Veterinary College, London, 1914.
Vouchers: G. S. Muir and J. G. Hardenbergh.

UMBERGER, G. M.
Harveyville, Kansas.
D.V.M., Kansas State College, 1919.
Vouchers: R. F. Coffey and Ashe Lockhart.

WHATLEY, D. E.
1930 Gage Blvd., Topeka, Kansas.
D.V.M., Colorado State College, 1922.
Vouchers: R. F. Coffey and A. Kushner.

WHEELER, N. M.
Box 476, Winnsboro, Texas.
D.V.M., Southwestern, 1912.
Vouchers: T. O. Booth and Ashe Lockhart.

WHITE, EDWARD A.
Sussex, N. J.
D.V.M., Cornell University, 1932.
Vouchers: K. W. Keyes and W. W. Bailey.

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## Second Listing

Adams, W. A., Glasco, Kansas.

Brenton, Willis L., 922 Alexandrine Ave., W. Detroit, Mich.

Brush, Loran, 110 E. Jefferson St., New Carlisle, Ohio.

Cameron, George L., 417 Bloomfield Ave., Montclair, N. J.

Cook, John W., 435 Gage Blvd., Topeka, Kansas.

Crawford, C. B., Horton, Kansas.

Droleskey, Edward A., 16 Church St., Springfield, Mass.

Dungan, William M., Forward Echelon, Hdqs. 9th Service Command, Presidio of San Francisco, Calif.

George, John W., State Veterinarian, State Dept. of Agri., Jefferson City, Mo.

Hackney, E. L., 504 W. Adams, Temple, Texas.

Hayes, W. F., Farmersville, Texas.

Hueben, Frank H., 3421 Central St., Kansas City, Mo.

Hughes, Ernie C., P. O. Box 627, Jefferson City, Mo.

Hynes, W. S., 504 W. William St., Delaware, Ohio.

Johnson, George M., High St., Exeter, N. H.

Korb, Will W., Hill City, Kansas.

Legenhausen, Dale H., 511 New Federal Bldg., Atlanta, Ga.

Luckey, David F., 3969 Palm St., St. Louis, Mo.

Lovett, H. M., Eureka, Kansas.

MacCormack, C. D., North Baltimore, Ohio.

Mindell, Jack, R.F.D. No. 1, West Albany, N. Y.

Murphy, C. A., Jacksonville, Mo.

Murphy, E. E., New Haven, Mo.

Nelson, Chester L., Hdqs. II Army Corps, A.P.O., No. 302, c/o Postmaster, New York, N. Y.

Owen, Roger N., Box 213, Hiram, Ohio.

Roeschlein, W. H., 15 S. Dayton St., Worthington, Ind.

Rowles, L. W., 1412 Jewell, Topeka, Kansas.

Russell, H. B., 1616 Buchanan Ave., St. Joseph, Mo.

Rutherford, Frederick W., Maysville, Mo.

Stein, Perry D., 139 Groveland Pl., San Antonio, Texas.

Williams, J. D., Box 341, Colorado City, Texas.

Wuest, E. C., P. O. Box 45, Platte City, Mo.

## 1942 Graduate Applicant

**(Second Listing)**

**Colorado State College**

GREEN, WILLIAM W., D.V.M.
213 Old Capitol Bldg., Olympia, Wash.

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# COMING MEETINGS

California State Veterinary Medical Association. California Polytechnic School, San Luis Obispo, Calif., Jan. 4-6, 1943. E. E. Le Donne, 6200 Rockwell St., Oakland, Calif., secretary.

University of Pennsylvania Conference for Veterinarians. University of Pennsylvania, Philadelphia, Pa., Jan. 5-6, 1943. G. A. Dick, dean, School of Veterinary Medicine, 39th and Woodland Ave., Philadelphia, Pa.

Cornell University Annual Veterinary Conference. New York State Veterinary College, Ithaca. Jan. 6-8, 1943. W. A. Hagan, dean, New York State Veterinary College, Ithaca.

Dallas-Fort Worth Veterinary Medical Association. Adolphus Hotel, Dallas, Tex., Jan. 7, 1943. W. G. Brock, Jr., 110 Exposition Ave., Dallas, Tex., secretary.

Minnesota State Veterinary Medical Society. Lowry Hotel, St. Paul, Minnesota, Jan. 11-12, 1943. H. C. H. Kernkamp, University Farm, St. Paul, Minn., secretary.

Rhode Island Veterinary Medical Association. Narragansett Hotel, Providence, R. I., Jan. 12, 1943. J. S. Barber, 560 Pleasant St., Pawtucket, R. I., secretary.

Indiana Veterinary Medical Association. Hotel Severin, Indianapolis, Ind., Jan. 12-14, 1943. Charles C. Dobson, New Augusta, Ind., secretary.

Maine Veterinary Medical Association. Waterville, Maine, Jan. 13, 1943. J. F. Witter, University of Maine, Orono, Maine, secretary.

New York City Veterinary Medical Association. Hotel New Yorker, 34th Street, New York, N. Y., Jan. 13, 1943. C. R. Schroeder, Box 247, Pearl River, New York, N. Y., secretary-treasurer.

Southeastern Michigan Veterinary Medical Association. Meeting at 3919 John R. Street, Detroit, Mich., Jan. 13, 1942. F. D. Egan, 17422 Woodward, Detroit, Mich., secretary.

New Jersey Veterinary Medical Association. Hotel Hildebrecht, Trenton, N. J., Jan. 14, 1943. J. R. Porteus, P. O. Box 938, Trenton, N. J., secretary.

Kansas City Veterinary Medical Association. Hotel President, Kansas City, Mo., Jan. 19, 1943. E. F. Sanders, c/o Jensen-Salsbery Laboratories, Kansas City, Mo., program chairman.

South Carolina Association of Veterinarians. Wade Hampton Hotel, Columbia, S. C., Jan. 19, 1943. R. A. Mays, 415 J. C. Calhoun State Office Bldg., Columbia, S. C., secretary.

Texas State Veterinary Medical Association. (Board of Directors only) Veterinary Hospital, College Station, Tex., Jan. 22, 1943. T. O. Booth, 2002 W. T. Waggoner Bldg., Fort Worth, Tex., corresponding secretary.

Michigan State College Post-Graduate Conference for Veterinarians. East Lansing, Mich., Jan. 25-29, 1943. Ward Giltner, dean, Division of Veterinary Science, Michigan State College, East Lansing, Mich.

District of Columbia Veterinary Medical Association. Mayflower Hotel, Washington, D. C., Jan. 26, 1943. Wm. M. Mohler, 5508 Nebraska Ave., N. W., Washington, D. C., secretary.

Iowa Veterinary Medical Association. Hotel Fort Des Moines, Ia., Jan. 26-28, 1943. C. C. Franks, 855 Thirty-First St., Des Moines, Ia., secretary.

North Carolina Conference for Veterinarians. N. C. State College, 205 Polk Hall, Raleigh, N. C., Jan. 26-29, 1943. D. C. Grinnells, State College Station, Raleigh, N. C., program chairman.

Ontario Veterinary Association. Royal York Hotel, Toronto, Ont., Jan. 28-29, 1943. F. H. S. Lowrey, 2555 Bloor St., W., Toronto, sec., H. S. Mac Donald, 1632 Bloor St., W., Toronto, program chairman.

Vermont Veterinary Medical Association. The Tavern, Montpelier, Vt., Jan. 30, 1943. G. N. Welch, 43 Union St., Northfield, Vt., secretary-treasurer.

Connecticut Veterinary Medical Association. Bond Hotel, Hartford, Conn., Feb. 3, 1943. Geo. E. Corwin, Lock Box 53, Suffield, Conn., secretary-treasurer.

Nebraska State Veterinary Medical Association, Lincoln, Neb., Feb. 4-5, 1943. S. W. Phillips, David City, Neb., program chairman.

Southeastern Michigan Veterinary Medical Association. Meeting at 3919 John R. Street, Detroit, Mich., March 10, 1943. F. D. Egan, 17422 Woodward. Detroit, Mich., secretary.

### Meetings Postponed or Canceled

Intermountain Livestock Sanitary Association. Salt Lake City, Utah, Jan. 6-7, 1943, canceled.

Ohio State Veterinary Medical Association. Meeting of Jan. 6-8, 1943 has been canceled. R. E. Rebrassier, Ohio State University, Columbus, Ohio, secretary.

American Association for the Advancement of Science. Meeting of Dec. 28, 1942-Jan. 2, 1943, has been postponed.

Houston Veterinary Medical Association. Archie Stallings, 801 Waugh Drive, Houston, Texas, secretary. Meetings for the Houston Association have been postponed for the duration.

Louisiana Veterinary Medical Association. Dalrymple Bldg., Louisiana State University, Baton Rouge. Date undetermined—possibly no meeting this coming year. C. M. Heflin, secretary-treasurer.

South Dakota Veterinary Medical Association. J. T. McGilvray, R. R. No. 3, Sioux Falls, S. Dak., secretary-treasurer. Meetings for the South Dakota Association have been postponed for the duration.

Virginia State Veterinary Medical Association. E. P. Johnson, Box 593, Blacksburg, Va., secretary. Winter meetings have been postponed.

Wisconsin Veterinary Medical Association. B. A. Beach, University of Wisconsin, Madison, Wis., secretary. Annual (winter) meeting cancelled.

Tennessee Veterinary Medical Association. Meeting of Jan. 18-19, 1943, has been canceled. A. C. Topmiller, Murfreesboro, Tenn., secretary.

Kansas Veterinary Medical Association. Wareham Hotel, Manhattan, Kan., Jan. 11-12, 1943. Chas. W. Bower, 1128 Kansas Ave., Topeka, Kan., secretary.

Many a shipload of food for the Army and Navy would never have been produced but for the watchful ways of the veterinary service.

## BIRTHS

A daughter was born to Dr. and Mrs. E. H. Gloss of Gaylord, Minn., February 12, 1942. Dr. Gloss graduated from Iowa State College in 1931.

To Major and Mrs. Walter G. Galloway, Bowman Field, Louisville, Ky., a daughter, Trudie Isabelle, Nov. 19, 1942.

To Dr. and Mrs. William G. Magrane, Route 20, Mishawaka, Ind., a son, Oct. 6, 1942.

To Dr. and Mrs. P. E. Maland, Charles City, Ia., a daughter, Janet Rae, Nov. 11, 1942.

To Dr. and Mrs. Clif Mickelson, Webster City, Ia., a daughter, Carol Joan, Oct. 22, 1942.

To Dr. and Mrs. R. A. Minor, Sigourney, Ia., a daughter, Margaret Jean, Oct. 14, 1942.

To Dr. and Mrs. Simon Minsky, 541 Ashford St., Brooklyn, N. Y., a daughter, Sept. 15, 1942.

To Captain and Mrs. Robert Tolley, Fort Monroe, Va., a daughter, Oct. 15, 1942.

To Lt. and Mrs. C. C. Vierling, Camp Livingston, Alexandria, La., a son, Randolph Clarence, Oct. 6, 1942.

## DEATHS

**Wm. D. Mandeville** (C.V.C., '18), 46 years old, died at his home in Chicago, Nov. 24, 1942, after a lingering illness. He joined the AVMA in 1942.

**Lt. Col. Joseph M. Curry** (Ont., '10), 50 years old, of Hartford, Conn., died at the LeGard Hospital, New Orleans, Nov. 6, 1942, from illness contracted in the line of duty. He entered the Army *via* the National Guard of his state, which he had served for sixteen years. He was interred with military honors at Soldiers' Field, Wilson, Conn., on Armistice Day.

**Ira V. Carpenter** (Ind., '13), 57 years old, of South Bend, Ind., died at the Epworth Hospital, Dec. 6, 1942, after a two-week illness. Formerly an inspector of the U. S. Bureau of Animal Industry, he engaged in practice in South Bend in 1919 where he enjoyed a large clientele. He joined the AVMA in 1916.

**Vernon B. Height** (N.Y.C.V.S., '95), died Oct. 13, 1942, at Asbury Park, N. J., where he conducted a mixed practice. He joined the AVMA in 1940.

**W. D. Coon** (Ont., '12), 63 years old, Forest Grove, Ore., died after a lingering illness Nov. 18, 1942. Dr. Coon, native of South Dakota, where he was born in 1879, located in Forest Grove immediately after graduating and thus became a prominent citizen, serving for years as chairman of the school board, member of the city council, director of the chamber of commerce, member of the State Live Stock Sanitary Commission (since discontinued), president of the Oregon State Veterinary Medical Association, and other positions indicating his rating in civilian and professional pursuits. His membership in the AVMA dates from 1919. He was the father of E. W. Coon, distinguished practitioner of Forest Grove.

## U. S. GOVERNMENT

**Further Limitation on Purchase of Laboratory Equipment.**—On Dec. 5, 1942, the War Production Board issued Limitation Order L-144, as amended, to further the control over purchases of laboratory equipment.

The amended order provides that no purchaser of laboratory equipment shall be permitted to acquire an item valued at more than $50, without securing an authorization for such purchase from the Director General for Operations.

Application should be made on Form PD-620. Purchases authorized on the basis of this form will be assigned an AA-4 rating.

"Laboratory equipment" is defined in the order to mean material, instrumetns, appliances, devices, parts thereof, tools, and operating supplies for laboratories, or for use in connection with operations usually carried on in laboratories, not including second-hand items.

### Sales of Rubbing Alcohol Restricted

The following announcement was made by the WPB Office of War Information on Nov. 12, 1942:

The unrestricted sale of rubbing alcohol and rubbing alcohol compounds was forbidden by Amendment No. 2 to General Preference Order M-30, announced by the Director General for Operations.

Under the existing order, deliveries of rubbing alcohol were limited to 70 per cent of those in the corresponding calendar quarter of the base period (July 1, 1940, to June 30, 1941). Today's amendment forbids the delivery of any ethyl alcohol or any compound containing it for use as rubbing alcohol except to licensed physicians, dentists, and veterinarians; holders of written doctor's prescription or orders; wholesalers, retailers, and

manufacturers for resale in accordance with the terms of this order; and to certain Government agencies. The action is expected to save nearly 2,000,000 gallons yearly.

Every corner druggist in America is affected by this order, for he is now forbidden to deliver rubbing alcohol except in accordance with the order. The net effect on the retailer will be to prevent him from selling ethyl rubbing alcohol except on written doctor's prescriptions or orders, or to professional people.

This further control over alcohol supplies is necessary because of the vast quantities being used in explosive manufacture, synthetic rubber, and numerous other chemical operations necessary in the war program.

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*Vitamin Standards in Force.*—As of Nov. 3, 1942, the following standards have been fixed for three vitamin products, by the Office of Price Administration:

1) Minicaps "B" is defined as a vitamin preparation, each capsule of which contains:

| | |
|---|---|
| Vitamin $B_1$ (Thiamin Chloride) | 3.0 mg. |
| Vitamin $B_2$ (Riboflavin) | 2.0 mg. |
| Nicotinic Acid Amide | 25.0 mg. |
| Calcium Pantothenate | 2.0 mg. |
| Vitamin $B_6$ | 2.0 mg. |

2) "Minicaps B with C" means a vitamin preparation, each capsule of which contains the following amounts of specific vitamin substances:

| | |
|---|---|
| Vitamin $B_1$ (Thiamin Chloride) | 3.0 mg. |
| Vitamin $B_2$ (Riboflavin) | 2.0 mg. |
| Nicotinic Acid Amide | 25.0 mg. |
| Calcium Pantothenate | 2.0 mg. |
| Vitamin $B_6$ | 2.0 mg. |
| Vitamin C | 50.0 mg. |

3) "Torulexin" means a vitamin preparation, each capsule of which contains the following amounts of specific vitamin substances:

| | |
|---|---|
| Vitamin $B_1$ (Thiamin Chloride) | 1.8 mg. |
| Vitamin $B_2$ (Riboflavin) | .5 mg. |
| Nicotinic Acid Amide | 5.0 mg. |
| Calcium Pantothenate | .25 mg. |
| Vitamin $B_6$ | .1 mg. |

Order No. 118 of the OPA establishes prices for manufacturers, wholesalers, and retailers of these products. The information was handed down at the request of the Upjohn Company, Kalamazoo, Mich.

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**Food and Drug Administration.**—Release of July 30, 1942, announces notices of judgment under the following violations of the Food, Drug, and Cosmetic Act:

*Drugs and Devices.*—(1) Potential danger when used according to directions; (2) failure to bear adequate directions or warning statements; (3) false and misleading statements in the labeling.

*Drugs.*—(1) Contamination with filth; (2) failure to comply with official or own statement, or substitution; (3) failure to bear required ingredient statement; (4) defective packaging.

*Surgical Dressings.*—(1) Nonsterile absorbent cotton; (2) contamination with viable microörganisms.

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**Brucellosis Eradication.**—Eleven counties in 10 states were added November 2, (1942) to those officially recognized by the U. S. Department of Agriculture as modified accredited Bang's disease-free areas, signifying practical freedom of brucellosis. These 11 counties contain approximately 172,000 dairy and breeding cattle over 6 months of age. The total number of counties in the United States so recognized is now 560, distributed among 24 states and containing more than 5,000,000 dairy and breeding cattle. Activities for the further suppression of Bang's disease are going forward in 151 additional counties in 18 states.

A county receives official designation as a modified accredited area when tests for that disease have been applied to all breeding cattle 6 months of age or older and the percentage of reactors to the last test does not exceed 1 per cent of the cattle and when the infected herds do not exceed 5 per cent of the total number.

The new declaration, issued by John R. Mohler, Chief of the Bureau of Animal Industry, that added the 11 new counties to the list also contains the names of 16 counties in 3 states where a sufficient number of retests had been made to extend the period of accreditation 3 years.

## AMONG THE STATES

### California

**State Civil Service Position.**—Announcement was made of a civil service examination (Jan. 9, 1943) for parasitologist, by the California State Personnel Board, to be held in various parts of the state. The salary is $215 a month plus $15 until *at least February 1, 1943.* The eligibility of candidates is based upon graduation from a college giving specialized work in parasitology, or degree of doctor of veterinary medicine, together with field or laboratory experience of two years in parasitic diseases of birds and mammals.

The announcement of an examination for

meat inspector open to graduates of recognized veterinary colleges, held Dec. 21, 1942, offers a basic salary of $200 a month.

## Delaware

**State Association.**—The annual meeting was held Nov. 12, 1942, in lieu of the customary time—December—in order to discuss a legislative act dealing with brucellosis which was drawn by a special committee of dairymen appointed by the Governor. The Association approved the proposed act after it was read by Dr. Harry McDaniel of the State Board of Agriculture and discussed by the members present. The attendance was 24, and the place of meeting, Middletown.

The following officers were elected: H. P. Eves, *president;* C. C. Palmer, *secretary-treasurer;* and V. C. Lancaster, M. L. Zurkow, and J. R. West, *directors.* C. C. Palmer was nominated for *resident secretary* of the AVMA, and the president and secretary were authorized to name delegate and alternate to its House of Representatives. Dr. Symington of Newark spoke on artificial insemination in cattle.

s/C. C. Palmer, *Secretary-Treasurer.*

## Illinois

**Poultry Disease School.**—The Department of Pathology and Hygiene, College of Agriculture, University of Illinois, held a school of instruction on poultry diseases for veterinarians, December 7. The curriculum included demonstrations on blood collection, tuberculin testing, autopsy technics, and a didactic course comprising:

**Robert Graham:** "The Need of Instruction on Poultry."

**Clarence Ems:** "National Plan of Poultry Improvement."

**E. P. Singsen:** "Culling."

**C. C. Morrill:** "Anatomical and Physiological Bases of Diseases in Poultry."

**P. D. Beamer:** "Importance of Sanitation in Poultry."

**C. E. Fidler:** "Pullorum Disease Control."

**A. K. Kuttler:** "Need for Tuberculosis Control."

**T. S. Hamilton:** "Nutritional Diseases" (Illustrated).

The course was followed by one-day sessions at the Leland Hotel in Springfield, December 14, 22, and 28, and will be continued through January and the first week of February at that place. These schools are conducted with the coöperation of the Extension Service in Agriculture and Home Economics, Assistant Director of Extension J. C. Spitler announces.

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The Extension Service of the University, in coöperation with the Department of Animal Pathology and Hygiene, has issued a circular calling attention to the seriousness of swine brucellosis and mapping out a plan of control. In order to demonstrate the diagnostic work required, a limited number of herds will be tested free of charge.

• • •

Following closely upon taking over the Stevens and Congress hotels, for the housing and teaching of naval personnel, the army air force has taken over the swank Chicago Beach Hotel on Hyde Park boulevard on the shore of Lake Michigan, for hospital and school purposes.

• • •

**The Committee on Local Arrangements** of the 1942 meeting held a dinner session in the Empire Room of the Palmer House December 22 to wind up its affairs and incidentally enjoy a social gathering commemorating the busiest six months of local history—the planning and carrying out on short notice, what proved to be quite a notable convention.

• • •

**State Association.**—The state association has a committee on leptospirosis, so named. The chairman is P. J. Meginnis, of Peoria. The object is to gather information as to the prevalence of that disease in the state and on methods of diagnosis and treatment. A questionnaire containing 15 basic questions was circulated among the practitioners in December.

## Iowa

**Iowa State College.**—Dean Murray of the Division of Veterinary Medicine announces a change in the date of opening under the "accelerated program." Quoting:

"To best carry out the provisions of the accelerated program of the college, first-year students in Veterinary Medicine will begin their work in the 1943 summer quarter, which will open on June 7. No new students will be accepted for September.

"In order to facilitate matriculation of applicants the final meeting of the Committee on Admissions will be held on April 15, 1943, instead of June 20, the date announced in the college catalogue.

"High school records and applications for admission may be filed at any time before April 15, 1943, but it is urged that they be in the office of the registrar by January 1, 1943. A transcript of all college courses completed by that date must reach this office not later than April 15. The transcript must also include a list of additional courses that the applicant expects to complete by June 5. This will enable the Committee to determine whether courses

already finished and those in progress, when completed, will meet the announced entrance requirements.

"Students in the Division of Veterinary Medicine are required to attend during the four quarters of the year. No student should apply unless he expects to be available for continuous attendance until graduation.

"Correspondence concerning this announcement should be addressed to:

s/J. R. SAGE, *Registrar.*"

• • •

**State Board Examinations.**—The Iowa Veterinary Medical Examining Board will hold licensure examinations at the State House, Des Moines, March 22-23, 1942. Applicants will report at the office of the Division of Animal Industry at 8 a.m., March 22. Applications must be filed with C. C. Franks, chief of the Division, at least thirty days prior to this date.

s/C. C. Franks.

## Kansas

**Personal.**—Mary Folse, eldest daughter of Charles D. Folse, of the Curts-Folse Laboratories of Kansas City, Kans., is training for service in the language department of the WAVES at Smith College.

## Missouri

**State Association.**—Secretary J. L. Wells writes: "Recent developments prompt us to withhold announcement of any dates for our 1943 meeting in Columbia, pending results of a mail vote by members."

• • •

**Personal.**—J. D. Wilcoxon, formerly assistant to F. H. Suits, of Odessa, has purchased the practice and equipment of the late H. J. Hearrington, of Lexington.

• • •

**Personal.**—A. H. Quin (C.V.C., '20), Des Moines, Iowa, for many years editor of the Fort Dodge *Bio-Chemic Review* and special representative of the Fort Dodge Laboratories, has accepted a position as editor of the *Jen-Sal Journal* and head of the department of clinical veterinary medicine of Jensen-Salsbery Laboratories, Kansas City.

## New York

**Winthrop Chemical Company Wins Award.**—The government has awarded the Winthrop Chemical Company the "Army-Navy Production E" in recognition of its services to the Army and the Navy, among which is the production of the quinine substitute Atabrine which is playing an important rôle in antimalarial medication in the armed forces. The procurement of 270 million doses of Atabrine by the Army alone is reported in the December number of *Readers Digest* by Paul de Kruif in an article titled "Enter Atabrine—Exit Quinine."

## Ontario

**Personal.**—G. A. Rose, Toronto, senior veterinarian, grade 3, has been promoted to the position of assistant chief inspector, at Ottawa. Dr. Rose, once Capt. Rose, is a veteran of World War I, serving four years in France and India. He is an honored member of the AVMA.

## Oregon

**State Association.**—The quarterly meeting of the Oregon State Veterinary Medical Association was held at McMinnville, Oct. 4, 1942. The program was as follows:

**Elwyn Coon,** Forest Grove: "Report of Seattle Meeting" and miscellaneous paper.

**J. N. Shaw,** Corvallis. "Disease of Sheep."

**J. H. Harrison,** Portland: "Feline Practice."

**W. H. Lytle,** Salem: "Livestock Enzoötics throughout the State."

**O. H. Muth,** Corvallis: "The AVMA Meeting in Chicago."

**W. F. Osborn,** Corvallis: "Artificial Insemination."

The officers elected were O. H. Muth, *president;* E. E. Chase, *vice-president;* E. W. Coon, *secretary-treasurer.* J. B. Harrison and Thomas Sims were elected to the Board of Governors for three years and one year, respectively.

s/O. H. Muth, *Resident Secretary.*

## Saskatchewan

**Provincial Association.**—The Veterinary Association of Saskatchewan held its 1942 annual meeting in the Parliament building, at Regina, November 28, Vice-President N. D. Christie presiding in the absence (on account of illness) of President Norman Wright, who had not missed an annual meeting for thirty years. The program was featured by the following contributions:—

**Ronald Gwatkin,** Veterinary Research Station, Lethbridge, Alberta: "Illustrated Lecture on Swine Diseases," emphasizing, particularly, the need of animal protein to obtain rapid growth and increased resistance to disease in pigs.

**G. J. McDonald,** of Assiniboia: "Bovine Parturient Apoplexy." The need of more veterinarians in certain districts better to conserve domestic animals and plans for coöperation with the Department of Agriculture to accomplish that end were discussed at length and a resolution was passed on re-establishing the Canadian Army Veterinary Corps.

Officers elected were N. D. Christie, *president;* W. A. Robinson, *vice-president;* L. L. Hewitt, *secretary-treasurer.* The Council of the Association consists of N. D. Christie, Regina; Norman Wright, Saskatoon; J. L. Millar, Regina; W. A. Robertson, Norquay; D. W. McDonald, Moose Jaw; and L. L. Hewitt, Regina.

s/L. L. Hewitt, *Registrar.*

### Texas

**Personal.**—Verne A. Scott, K.C.V.C. '18, professor of veterinary medicine, Tarlington Agricultural College, judged the Palomino entries of the horse show of the Kansas Livestock Association at Wichita in October. Says the *K.C.V.C. Alumni Quarterly:* Doctor Scott is one of the few good judges of that breed of horses and is also an accredited judge of all classes of livestock, except gaited saddle horses.

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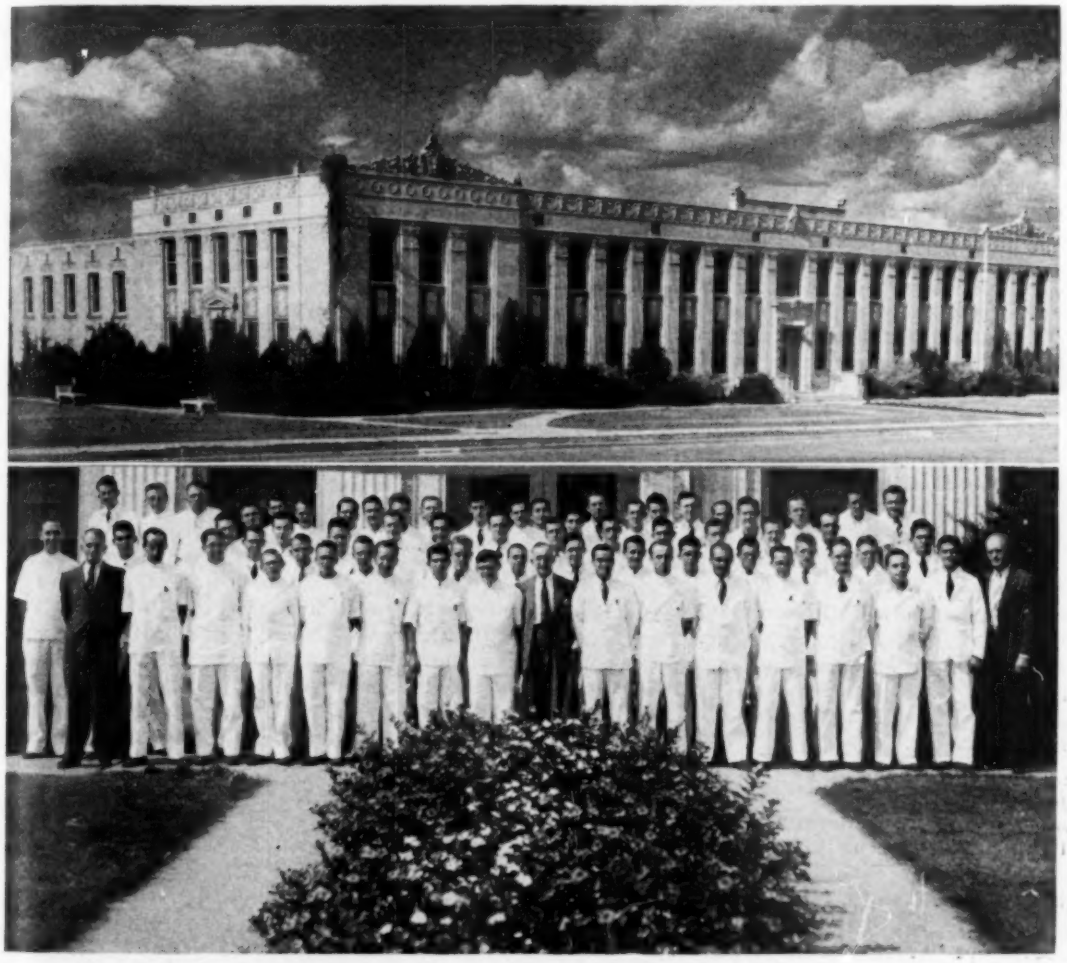
### West Virginia

**State Association.**—The annual meeting of the West Virginia State Association was held in Clarksburg on Nov. 23, 1942. This was entirely a business meeting and was attended by 34 veterinarians of the state. The same officers for last year were carried over the next year, namely, W. E. Trussell, Charles Town, *president;* H. C. Williams, Clarksburg, *vice-president;* and J. H. Rietz, Morgantown, *secretary-treasurer.*

**S. E. Hershey,** Charleston, was elected delegate to the House of Representatives for the ensuing two years, and **H. M. Newton,** Charleston, was elected alternate.

**E. N. Moore,** Oglesbay Hall, Morgantown, was nominated for resident secretary to the president elect of the AVMA for 1943-44.

s/J. H. Reitz, *Secretary-Treasurer.*



The Veterinary Hospital of the School of Veterinary Medicine, Agricultural and Mechanical College of Texas, and the graduating class of the School of Veterinary Medicine, January, 1943.

# THE VETERINARY PROFESSION AND THE WAR

## Statement from the Office of Price Administration Concerning Mileage Rationing for Veterinarians

Early in November, the AVMA office requested from OPA information that would clarify the gasoline rationing program as it affects veterinarians and help to answer numerous inquiries from members regarding the restriction of preferred mileage to "farm veterinarians," so-called. In replying to this request, John R. Richards, chief, Gasoline Rationing Branch, OPA, wrote as follows:

> "We very much appreciate the opportunity you have offered us of clarifying the Mileage Rationing Program as it relates to members of your profession. The immense volume of correspondence we have received made it impossible to meet your deadline for the December issue (of the JOURNAL), but we hope the enclosed statement, which we have prepared at your request, will be considered timely enough to be printed in the January issue."

The statement follows:

The Office of Price Administration has been ordered by William M. Jeffers to institute and administer a nation-wide Mileage Rationing Program for the purpose of guaranteeing the continued operation of our rubber-borne passenger car transportation. This directive is in accord with the recommendations of the Baruch Report.

We are sure that, once the seriousness of the rubber problem is realized, the veterinarians of America will support the Mileage Rationing Program as enthusiastically as they support every other war measure. A few facts tell the whole story.

We have lost 90 per cent of our pre-war sources of natural rubber to Japan. We have on the wheels of our 27,000,000 passenger cars a priceless reserve of 1,000,000 tons of rubber. If we continue to drive as usual, in less than six months one-half of all tires on our passenger cars would be worn to the point that further driving would be dangerous, and, moreover, these tires would be ruined for recapping. If the present rate of wear continues, by far the greatest number of civilian cars will be off the road next year, and in 1944 there will be all but a complete collapse of passenger cars upon which our transportation largely depends.

The potential consequences are appalling: 80 per cent of our workers depend upon their cars to reach their places of employment. If our automobiles stop rolling, the wheels of our defense plants stop too. We face a breakdown of our war-time economy. The rubber front is the war front; if we lose the battle of rubber conservation, we lose the war.

The Mileage Rationing Program is the only solution for this grim problem. In the words of the Baruch Report:

> Gas rationing is the only way of saving rubber. Every way of avoiding this method was explored, but it was found to be inescapable. This must be kept in mind: the limitation in the use of gasoline is not due to shortage of that commodity—it is wholly a measure of rubber saving. Any localized measure would be unfair and futile.

Mr. Jeffers has recently emphasized the fact that the rubber problem is critical. All that can be promised is that we have a fighting chance to keep rolling if we are extraordinarily careful. Therefore, to implement rubber saving by control of gasoline consumption, our program utilizes the nation-wide speed limit and a tire purchase and tire inspection plan. As a result of this three-way control, we have been able to integrate the tire and gasoline regulations so that persons in essential occupations will be eligible for tires of the quality needed to drive the mileage allowed by their gasoline rations.

In order to make the Mileage Rationing Program effective, we must have the complete coöperation of our citizens. Our experience with the East Coast program showed that one-half of the gasoline gallonage issued was granted for purposes defined as "preferred,"

although the users of this gallonage comprised less than one-fifth of the total number of passenger car operators. Clearly, then, if we are to make any significant further saving of mileage, it must be achieved by persons in the preferred categories. Farm veterinarians constitute one of the limited number of these categories of persons whose work is deemed essential to the war effort and to the public health and safety.

Under the Regulations for the national program, a basic ration is issued for use with a registered passenger automobile which provides 240 miles of driving a month, calculated on a basis of 15 miles per gallon. In the East Coast area, a very serious shortage of petroleum products has made it necessary to reduce this basic ration to 180 miles. Persons whose necessary occupational driving exceeds 150 miles a month are eligible for supplemental rations in the form of the "B" book, which allows up to 20 miles a month for occupational purposes. In order to qualify for this "B" ration, a person must demonstrate that the mileage is necessary for his work and that he is sharing his car with three or more persons in the pursuit of their occupations, or that it is impossible to do so and that reasonably adequate means of transportation are not accessible. A person eligible for the "A" and "B" rations may count upon 470 miles of driving a month for occupational purposes. In most cases this mileage should be adequate for the occupational driving needs of veterinarians in metropolitan areas. Preferred mileage, that is, supplemental occupational mileage in excess of 470 miles a month, may only be granted for travel which is preferred; this "C" ration is tailored to exact requirements by the Local War Price and Rationing Boards, and the applicant therefore must satisfy the same conditions which govern the issuance of the supplemental "B" ration.

As regards veterinarians, the Regulations read:

> The mileage driven in a passenger automobile or motorcycle by the owner or a person entitled to the use thereof, necessary for carrying out one or more of the following purposes, shall be deemed preferred mileage:
>
> By a farm veterinarian for rendering professional service at agricultural establishments, but only if the applicant is licensed by the appropriate governmental authority and regularly renders such professional services.

The exigencies of the rubber supply situation make it impossible to grant preferred mileage to veterinarians for the purpose of attending to household pets; mileage for such work is restricted to that provided by the "B" ration.

It should be emphasized that these provisions are analogous to those which govern the professional activities of all other branches of medicine: every applicant for supplemental rations must satisfy the ride-sharing and alternative means tests; no veterinarian, doctor, surgeon, or dentist is *as such* eligible for a "C" ration; those members of the medical profession who practice in their offices, as many veterinarians do, are not eligible for this ration; preferred mileage is not granted to anyone for travel between home and office.

We recognize that these provisions will make it necessary for many persons in your calling to modify their former ways of conducting practice, but driving not directly related to the war effort must be cut to the bone. Every operator of a passenger automobile is a trustee of the national interest. We are sure that we can count upon the coöperation of a group of men whose work is governed by humanitarian considerations. In particular, we hope that farm veterinarians, whose indispensability has been recognized by their inclusion in the preferred categories, will regard their preferred status, not as a personal privilege, but as a moral responsibility. When the Mileage Rationing Program begins, there are certain concrete things which a veterinarian can do to help make this mandatory war measure effective:

1. He can remember that no veterinarian is *per se* eligible for a "C" ration.

2. He can remember that his local War Price and Rationing Board is required to count 150 miles of his basic ration as available for occupational purposes in the computation of his mileage for the issuance of supplemental rations.

3. He can return to his local Board all unused coupons which have accrued to him as a result of a natural over-estimation of need or of over-generous "tailoring" on the part of the Board.

4. He can observe the 35 mile speed limit at all times.

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## Commissioning of Additional Veterinarians Authorized

Under date of Dec. 15, 1942, the following information was received from Brig. General R. A. Kelser, Director of the Veterinary Division, Surgeon General's Office, War Department, Washington, D. C.:

In connection with inquiries from veterinarians concerning commissions in the Veterinary Corps, Army of the United States, this is to inform you that the commissioning of such additional veterinarians as may be necessary to meet requirements for the coming year has now been authorized.

Appointments will not be made immediately

in numbers sufficient to cover anticipated requirements for the entire year. The commissioning of the additional veterinarians required will be spread over the year to meet needs as they develop. Thus, as applications are received, only such number will be commissioned as are required for current needs and those of the immediate future. In making selections, equal consideration will be given recent graduates holding Medical Administrative Corps Commissions, those who fail to receive deferment under the Selective Service Act and are inducted as privates, and others meeting the prescribed requirements as to age, citizenship, physical condition, basic and professional training, adaptability for military service, etc.

Information and application forms may be obtained by addressing the Director, Veterinary Division, Surgeon General's Office, Service of Supply, War Department, Washington, D. C.

## Graduation Dates of Veterinary Colleges in the United States Under Accelerated Program

The following are the dates of graduation reported for the veterinary schools which are operating under accelerated curriculums for the duration of the war, or as long as may be necessary:

**Alabama Polytechnic Institute:** March, 1943; December, 1943; August, 1944; June, 1945.

**Colorado State College:** Dec. 23, 1942. No information on later dates.

**Iowa State College:** March, 1943; December, 1943; August, 1944; August, 1945.

**Kansas State College:** Jan. 23, 1943; July 27, 1943; June 1 of each succeeding year.

**Michigan State College:** Mar. 20, 1943; December, 1943. Every 9 months thereafter.

**New York State Veterinary College:** Jan. 28, 1943; September, 1943. Every 9 months thereafter.

**Ohio State University:** Last of March, 1943. Every 9 months thereafter.

**Pennsylvania, University of:** Apr. 3, 1943. No information on later dates.

**Texas A. & M. College:** Jan. 22, 1943. No information on later dates.

**Washington State College:** About June 1, 1943; February, 1944; September, 1944.

The particular attention of state veterinary examining boards is invited to the foregoing information. Some boards have already arranged to give licensing examinations soon after the senior classes of the schools in their state or area are graduated, in order that the new graduates may qualify without undue delay for practice in an essential capacity in communities where they are badly needed. It is suggested that the state boards which have not already done so take the matter under consideration and advise the deans of the respective veterinary schools of any action taken and the dates on which examinations will be given.

## What Wartime Price Control Means to All of Us

An exaggerated rise in the cost of everyday living is the first great evil of inflation —and inflation is as deadly an enemy as Hitler or Hirohito to the welfare of our country. People now have more money to spend, for more of them are working, and often working longer hours at increased pay. But there are fewer things to buy, because our raw materials, our manpower, our machines, our transportation facilities are being largely used for the war effort, and only what is essential is being devoted to civilian needs. Already there are no new cars, few refrigerators or washing machines for us to buy; soon we will notice great empty spaces on the shelves of our stores.

Left uncontrolled, we would soon be bidding against each other with our *more money* for the *fewer things* there are to buy, and the cost of living would reach dizzy heights. Then when the bubble burst, there would be countless bankruptcies, widespread unemployment, misery and want everywhere. Our victorious troops would return from overseas only to find that we at home had not done our part; they would find instead of a land fit for heroes, a land of desolation and despair.

Let us remember that as a result of the last war, the cost of living rose over 100% —which is the equivalent of a 50% pay cut!

Now our Government has acted to stop price increases—to keep down our cost of living and the cost of the war. Under the General Maximum Price Regulation issued by the Office of Price Administration, no storekeeper, wholesaler, or manufacturer can raise the price of most of the things we eat, wear, and use.

Chickens fed acorns lay eggs with olive-colored yolks—*From Poultry Science.*

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# An' Related Topics

## Favorite Breeds of Dogs

Speaking of the many breeds of *Canis domestica* in the drama of family life,

> Breathes there a man with soul so dead
> Who never to himself hath said,
> This is my own, my *beloved breed!*
> —*Apology to Sir Walter Scott.*

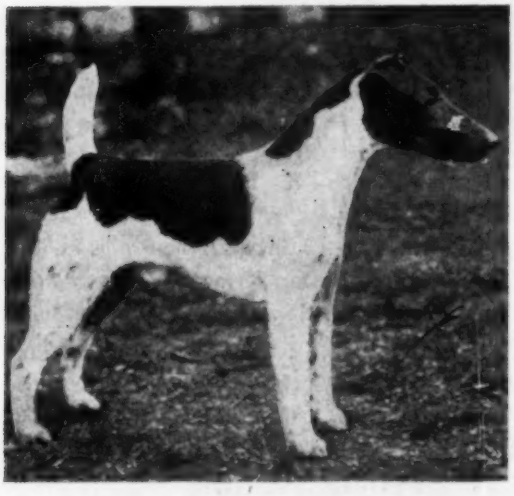
No dog is more proud, and none more useful than the purebred Collie.

We get a hunch once in a while that even the editors of dog magazines declare (between the lines) their preference for certain breeds of dogs, rash as it is to use editorial ink that way in the realm of pandogdom, or any other "pan" of domestic fauna for that matter. Declaring preference for breeds of livestock must be broached like the testimonial for the Irishman's liquor: "It's all good, but some's better than t'others."

Whereas, *An' Related Topics* is *sans souci* in that respect, the editor risks the naming of the three supreme breeds of the canine world, namely: the proud Collie, the shorthaired Fox Terrier, and the beloved Beagle. It's our notion that here are more ounces of brain per aliquot and more satisfaction per diem, than in any dozen bundles of canine flesh. How do you like the choice?

Lovable K9 of the nursery, the home and the field.

The editor of *A. R. T.* will pay one dollar for every reply published.



The best cure we know for cynophobia is this tramp of the canine realm.

---

What to do after the war seems to be bothering more people than what to do now.

> The casualties of our first year of war are lower than the casualties of the highway for that period. 'Till now, Hitler, Hirohito, and Mussolini are running a poor second to the automobile.

# You can recommend NEW PARD as a full, safe diet!

"*NOW that canned dog food is out—what should we feed our dog?*" That's a question the veterinarian is often asked these days. And now, as before, he can recommend Pard with complete confidence.

Basically unchanged, all the Pard health-building ingredients are present in New Pard. It provides the essential food elements, minerals, and vitamins that dogs must have for sound, vigorous condition. Only the moisture has been removed by scientific dehydration* to permit new packaging that saves tin. Simply add water before serving.

You will find New Pard economical to feed. 2 packages go just as far as 3 cans did—and no other food is normally needed. New Pard is tempting as ever to the canine appetite!

**New Pard looks like fresh ground food** when water is added! New Pard is scientifically dehydrated—not baked or dried at high cooking temperatures.

**Convenient for dog owners!** Merely adding water makes New Pard complete. No stirring, no mixing, nothing else needed!

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*THIS litter of healthy whelps may owe its existence to the aid of* PERANDREN. This most powerful of the male sex hormones is making excellent therapeutic history in the treatment of selected cases of sexual impotence in small and large animals. One report cites tying within 48 hours after injection of *PERANDREN** with subsequent birth of healthy pups.

Too often one or more of the weaklings in a litter are lost within the first few hours after birth. *CORAMINE*, has proven of value in giving weaklings sufficient initial stimulation to save them. The therapeutic dosage is so markedly less than the toxic dose of *CORAMINE** that little fear need attend its use.

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## Common Errors (=Jargon)

"There was no pathology" wears out more blue AVMA lead than all of the other more flagrant errors in usage, but a close second is "the etiology is unknown." It's a fine idea to watch these "ologies." Pathology and etiology are sciences, not conditions. Fox (*J.A.M.A.* Nov. 7, 1942) caught physicians writing "the patient had a negative serology" and wonders how come the literature has escaped "there was no ophthalmology." Believe it or not, we've seen "no hematology apparent," in an unpublished AVMA article.

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## Face the Realities

The Japs' attack on the United States began in Manchuria in 1931, not at Pearl Harbor in 1941 as we are wont to believe. Perhaps, Commodore Perry (1853) had something to do with it, too. He started the Japs on the way up (or down) to what is called civilization. It took but 77 years (1853-1931) and the prodding of an occidental country (Germany) to ignite the flame now raging all over the world. The chain of events: Mukden (1931)—Shanghai (1932)—Peiping (1937)—U. S. S. *Panay* (1937)—Join Axis (1939)—Pearl Harbor (1941)—Manila (1942). The remedy lies in the American factories, and British and American courage, not in babbling oratory. Your job, Mr. Veterinarian, is to help conserve national wealth, public health and the food supply of the armed forces and general population. Are you doing your bit toward the unity of action for which the professional societies are striving?

---

It's a fine idea to love your neighbor but it's better to be able to make it unsafe for him to down you.—*Sorrel and Son.*

---

A cubic centimeter of air contains 10,000,000,000,000,000,000 molecules. There is no practical significance to attach to this figure, except in showing that a molecule is not a giant.

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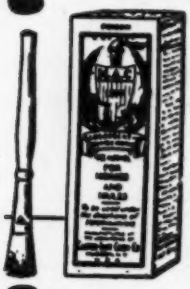

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## Is World War II Another Case of "My Kingdom for a Horse?"

The communique of a single military operation around Stalingrad catalogued *900 horses* among the tanks, cannons, and men captured. The description of another offensive north of Moscow speaks of artillery being spirited to position in the "dead of night with *muffled horses.*" This operation yielded a quota of German horses, number not stated.

Obviously, the hackneyed motto *"The nation that goes to war without horses is licked from the word go"* is becoming more understandable, for, when the blitzes of mechanization die down (from several reasons one can think of) horses and foot soldiers come into play and turn the tide of battles. The deadlocked western front of World War I has not been forgotten by the Russians and Germans. The horrors of the blitz have not blinded them to the fundamentals of the scientific military operation. They still remember that soldiers must move to win battles and that their needs must move forward with them. Wise generals still see the forest in spite of the trees.

---

Up to now everyone attempting to predict events to come in this war has guessed wrong. Better to admit that no one can tell when/whence/where the bombs and other guests are going to drop in for a visit. Despite the prognosticators' voluntarily expounded predictions "it *can* happen here"—right here in your back yard.

---

The first veterinary corps of American history was established in France during the World War operations of 1918. It provided veterinary officers for troops, evacuation units, collecting stations, and veterinary hospitals. The appointment of army, corps, and division veterinarians was directed by Commander-in-Chief John G. Pershing, in executive orders issued in July, 1918. The document is identified as General Orders, No. 122, A.E.F.

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## .weak labor

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*Issued Under Date of*

October 1940
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**Dean, Veterinary Faculty**

## Duds

Soldiers of World War I will recall the duds, the shells that did not explode. While collecting disabled horses along the Meuse, north of Verdun several days after the Armistice, a veterinary unit built a fire in a barnyard to keep warm. Under the fire was a German 155 buried in the ground unseen. Result: An explosion, a tell-tale crater, big enough to bury a couple of horses, and nobody hurt. Everyone was at mess 300 yards away. Numerous French farmers were killed while working in shell-torn fields, several years after the war.

The London correspondent for the *Journal of the American Medical Association*, under date of June 27, 1942, writes of the killing of 19 persons and the wounding of 59 by the explosion of bombs that had been buried unknown in a cellar since the air raid of May 10, 1941.

---

## Losing Livestock Relations

England and Scotland are carrying out the culling of unfit animals without employing veterinarians who, says *The Veterinary Journal* editorially, "could have assisted stockowners and others to reach decisions concerning animals to be removed from the herds, as disease and nonproductivity are intimately related. . . . Without doubt the veterinary profession can be used to a greater extent in the national effort to produce more and more food stuffs."

Last June, however, the Agricultural Improvement Council included veterinarians in its roster, but no similar action was taken in Scotland. It has been pointed out in another British veterinary publication that veterinarians in recent decades have been specializing at the expense of their livestock relations and now find it difficult to change the public's idea of the functions of veterinary medicine. In times of emergency, governments follow the peacetime pattern. They know no other. Nowhere is "In times of peace prepare for war" more applicable than in the veterinary service.

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***We shall strive to keep it flying.***

*Winthrop*

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## More Eggs Wanted

The annual egg production in the United States for the years 1936 to 1940 was 3,400,000,000 dozens. The estimate for 1941 is set at 3,676,000,000 dozens. The goal for 1942 is 4,000,000,000 dozens—a challenge to poultry producers by Secretary of Agriculture Wickard. "But," says OPM, "get along with 11,000 pounds of aluminum for wing-banding your chicks and none for leg-banding the layers." Moreover, poultry equipment has a very unfavorable priority rating, the *Poultry Tribune* complains.

Elsewhere we read, "Food will win the war and write the peace terms." But it is not at all likely that the chickens will lay 600 million more dozens of eggs if they have to go out in the trees to roost, if the chicks are crowded in too few brooder houses, and the potentiality of fine handling is thrown to the winds. Swivel-chair logic never did work in animal production.

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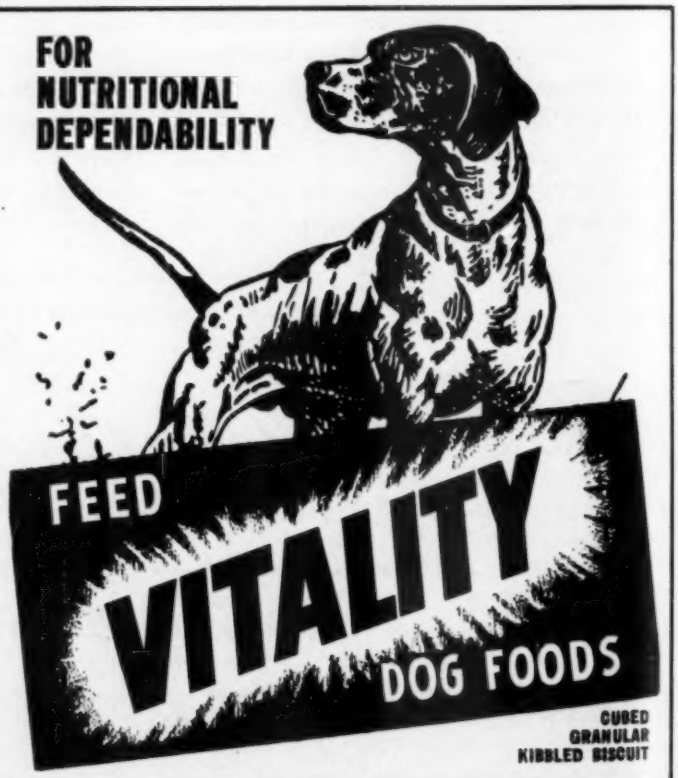

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